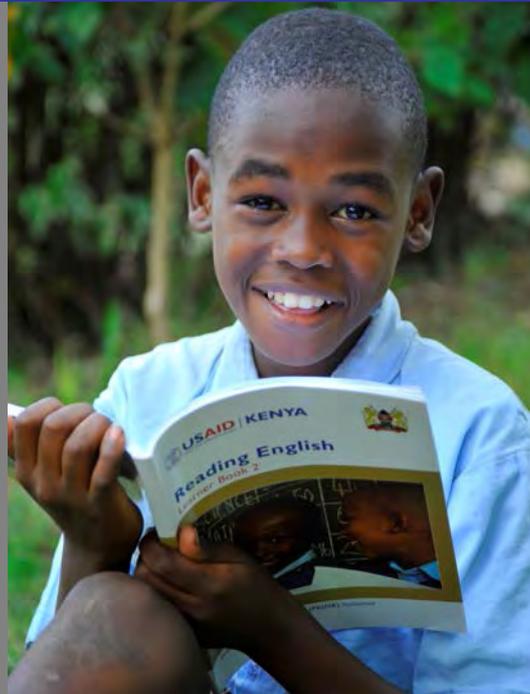




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USAID/Kenya Primary Math and Reading (PRIMR) Initiative: Final Report



July 2014

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Final Report

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The authors' views expressed in this report do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

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Abbreviations

CEB	County Education Board
CEMASTEIA	Center for Mathematics and Science Teaching in Africa
CfBT	CfBT Education Trust (formerly Centre for British Teachers)
clpm	correct letters per minute
CPD	continuous professional development
capm	correct addition items per minute
clpm	correct letters per minute
cspm	correct subtraction items per minute
cwpm	correct words per minute
DFID	UK Department for International Development
DQAS	Directorate of Quality Assurance and Standards
DQASO	District Quality Assurance and Standards Officers
EGMA	Early Grade Mathematics Assessment
EGRA	Early Grade Reading Assessment
EYC	Elimu Yetu Coalition
GPS	global positional system
ICT	information and communication technology
INSET	In-service Education and Training
KCPE	Kenya Certificate of Primary Education
KEMI	Kenya Education Management Institute
KICD	Kenya Institute of Curriculum Development
KIE	Kenya Institute of Education
KISA	Kenya Independent Schools Association
KISE	Kenya Institute of Special Education
KNEC	Kenya National Examinations Council
LCPS	low-cost private school
LTP2	Liberia Teacher Training Program
M&E	monitoring and evaluation
MLA	Monitoring Learning Assessment
MLN	Multilingual Education Network
MoEST	Ministry of Education, Science and Technology
NESP	National Education Sector Plan
NGO	nongovernmental organization
NQT	newly qualified teacher
ORF	oral reading fluency
PDIT	Programme Development and Implementation Team
DPP&EACA	Directorate for Policy, Partnership, and East Africa Community Affairs
PRIMR	Primary Math and Reading Initiative
PTE	Primary Teacher Education
PTTC	Primary Teacher Training College
QAS	Quality Assurance and Standards

RCT	randomized controlled trial
RTI	RTI International (trade name of Research Triangle Institute)
SACMEQ	Southern and Eastern Africa Consortium for Monitoring Educational Quality
SAGA	Semi-Autonomous Government Agency
SD	standard deviation
SMS	text-messaging service
SSME	Snapshot of School Management Effectiveness
TAC	Teachers' Advisory Centre
TSC	Teachers' Service Commission
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USG	U.S. Government

Executive Summary

This final report for the USAID/Kenya Primary Math and Reading (PRIMR) Initiative describes the activities and accomplishments of the complete program, from startup in August 2011 to closeout in August 2014. Given PRIMR's quantified achievements in engaging the public and private education sectors in Kenya and markedly improving pupil performance in reading and mathematics, the research team opted to treat this report as documentation of aspects of the program that could serve as a guide for Kenya as well as other contexts.

Background

PRIMR was a three-year applied research program, led by the Ministry of Education, Science and Technology (MoEST), funded by USAID/Kenya and implemented by RTI International, that eventually covered 547 formal public schools and low-cost private schools across Kenya.¹ It focused on improving numeracy and reading outcomes in Classes (grades) 1 and 2. As a task order under the Education Data for Decision Making (EdData II) project, PRIMR's scope was to apply innovative, *data-based* instructional improvement methods to increase students' fundamental skills in reading and mathematics. Further, it assessed how a sustainable reading and mathematics program could be implemented at scale. PRIMR also tested and monitored several scenarios within the public education system to determine which activities would most efficiently and cost-effectively improve pupil achievement. By design, the MoEST played a major role in advising and determining the purpose and direction of the USAID program as well as participating directly in implementation.

The idea for the PRIMR design came from a much smaller scale randomized controlled trial in 2007–2008. “EGRA–Kenya” was implemented in Malindi District, Coastal Province, in 40 schools, with half classified as treatment schools and receiving remedial reading interventions, and the other half serving as a control. The post-treatment assessment conducted in November 2008 showed surprisingly large improvements in reading scores after only about nine months of the intervention.²

Overall Program Design

Building on the lessons learned in Malindi, the full PRIMR experimental intervention also used a treatment–control design and focused on continual creation and revision of classroom materials. PRIMR and its Kenyan partners created, published, and distributed new teaching and learning materials, based on the existing Kenyan curriculum; designed and led professional development to build the skills of educators and improve student literacy outcomes; and introduced a number of innovative teaching methods. Teachers and head

¹ *Formal schools* (also *public* or *government schools*) were those operating under the auspices of the MoEST. *Nonformal schools*, which later became known more specifically as *low-cost private schools* (LCPSs) and in some cases, *complementary schools*, typically were operating in peri-urban settlements in Nairobi, in areas not served by government school facilities or personnel. Although all these terms were applied to private schools at various points during PRIMR, we use “LCPS” in the remainder of this report.

² For more information, see Crouch, L., Korda, M., & Mumo, D. (2009). *Improvements in reading skills in Kenya: An experiment in the Malindi District*. Prepared for USAID under the EdData II and Education for Marginalized Children in Kenya (EMACK II) projects. Research Triangle Park, North Carolina, USA: RTI International and Aga Khan Foundation. <https://www.eddataglobal.org/countries/index.cfm?fuseaction=pubDetail&ID=154>

teachers received training to encourage active learning and participation by both girls and boys in the classroom, and were further supported with frequent visits and advising by trained instructional coaches.



Teacher training, Silanga

By mutual agreement among the MoEST, USAID, and RTI, approximately 500 formal (public or government) schools and low-cost private schools (LCPSs) located in Nairobi, Kiambu, Nakuru, and Kisumu counties were to participate in the PRIMR Initiative. To choose the sample of formal schools, the project team first selected all eligible zones from within the selected locations, then

randomly assigned a subset of zones to groups that would receive the PRIMR treatment in phases (Cohorts 1, 2, and 3). Across all three cohorts, 262 formal schools were selected. Sampling for LCPSs began by clustering the schools into geographic groups of either 10 or 15 schools from across Nairobi's divisions. Twenty clusters then were randomly assigned to Cohorts 1, 2, or 3, stratified by geographic region. The number of LCPSs selected was 240.

In January 2012, the Cohort 1 schools (125 schools: 66 public, 59 LCPS) began implementing the reading interventions using PRIMR-designed materials and techniques, and the math intervention followed beginning in July 2012. The Cohort 2 schools (185: 65 public, 120 LCPS) began reading and math interventions in January 2013. Cohort 3 schools (101: 51 public, 50 LCPS) served as a control group for most of the program, and then began receiving the full intervention during the final stages of PRIMR (January 2014). In addition, it was decided that the 2014 phase of the intervention would be extended to all 547 remaining schools, rather than only to Cohort 3 as originally planned. As a result, the number of pupils benefitting increased from 12,755 in January 2012 to 56,036 in January 2014.

Randomly selected students from all treatment and control schools were assessed via administration of a combined Early Grade Reading Assessment (EGRA), Early Grade Mathematics Assessment (EGMA), and Snapshot of School Management Effectiveness (SSME) at three time points: baseline, midterm, and endline. The instructional approaches used by the project were informed by and revised as needed according to these classroom data. The data also helped to measure how effective the reading and math interventions were, including with regard to gender equity. Finally, the cumulative data informed policy dialogue with the MoEST about possible pedagogical investments to support improved outcomes for beginning learners, across gender and socioeconomic status.

The PRIMR Initiative's research design included several "experiments within an experiment." These consisted of a study of three different combinations of information and communication technology (ICT) as teaching and learning aids in selected schools in Kisumu County; a longitudinal study of about 600 students who were assessed at all three time points, with their reading and numeracy competency levels compared and contrasted across the assessments; and MoEST-driven policy research on various education issues at the national level.

In addition, two efforts underwritten by the British Department for International Development (DFID)/Kenya were closely intertwined with USAID's: the Rural Expansion Programme (Dec 2012–Feb 2015) and National Tablets Programme (Aug 2013–Feb 2015).

Key Research Findings

The randomized controlled trial design of PRIMR made it feasible to estimate the impact of PRIMR on learning. **Exhibit ESI**, organized according to selected subtasks from the English EGRA instrument, shows the mean scores at the endline for pupils in the PRIMR treatment schools (Cohorts 1 and 2) and those in control schools.



Reading together

For letter-sound fluency, treatment pupils in PRIMR identified 47.0 correct letters per minute (clpm) correctly, compared to 25.7 letters per minute among the control pupils. PRIMR's causal effect was 21.3 clpm, or 0.73 standard deviations (SD). In oral reading fluency, the PRIMR effect was 13.7 correct words per minute (cwpm) overall. If Cohen's effect size research says that .50 SD is a large impact, these are

very large. This equates to more than 1 year of gain for pupils in control schools. Reading comprehension scores were more than twice as high in PRIMR (21.1%) as they were in control schools (9.8%) in Class 1, and the absolute gain in comprehension attributed to PRIMR in Class 2 was 17.3%.

Although the number of pupils supported in 2013 nearly tripled from the year before, the proportion of pupils reading at benchmark by the time of the endline assessment was more than twice as high in PRIMR (28.3%) than control schools (12.6%). The impact of PRIMR also was felt on the proportion of pupils reading at the Kenya National Examinations Council (KNEC) benchmark for English (65 or more cwpm), with more than twice as many treatment pupils reading at benchmark in both Classes 1 and 2. Effect sizes were moderate to large across the English subtasks, with an average overall effect size of 0.46 SD.³

³ An effect size is calculated by dividing the causal program effect by the pooled standard deviation. It is a measure of the effectiveness of an intervention that can be compared against the effects in other programs.

Exhibit ESI. Endline impact of PRIMR treatment on English outcomes (selected measures)

English EGRA subtasks	Overall			Class 1			Class 2		
	Treat-ment	Control	Effect size	Treat-ment	Control	Effect size	Treat-ment	Control	Effect size
Letter-sound fluency (correct letters per min.)	47.0	25.7	<i>0.73</i>	43.5	24.6	<i>0.68</i>	50.8	26.8	<i>0.78</i>
Oral reading fluency (correct words per min.)	45.1	31.4	<i>0.40</i>	32.2	20.1	<i>0.44</i>	58.9	42.8	<i>0.45</i>
Reading comprehension (% correct out of 5 questions)	34.3	19.4	<i>0.38</i>	21.1	9.8	<i>0.38</i>	48.4	29.1	<i>0.44</i>
Reading at benchmark (% of pupils reading 65 cwpm+)	28.3	12.6	<i>0.36</i>	14.0	4.0	<i>0.32</i>	43.7	21.3	<i>0.45</i>
Average effect size			0.46			0.47			0.49

Exhibit ES2 presents PRIMR’s impact on Kiswahili, as measured by selected Kiswahili EGRA subtasks.⁴

For letter-sound fluency, the results show that the PRIMR effect was 15.6 clpm for Class 1 and 22.1 clpm for Class 2. The overall effect size for letter-sound fluency was 0.63 SD. Surprisingly, while the control classrooms were spending a great deal of time on learning syllables, the PRIMR program still showed a 0.41 SD effect on syllable fluency. In Class 2, that equates to 11.9 cspm. PRIMR effects on oral reading fluency were 7.0 cwpm (0.41 SD) in Class 1 and 6.7 cwpm (0.35 SD) in Class 2. Gains were also identified for reading comprehension, with a 0.45 SD effect in Class 1 and a 0.32 SD effect in Class 2.

For the proportion of pupils reading at the Kiswahili benchmark (45 wpm), scores among pupils receiving the PRIMR treatment were nine times larger in Class 1 (0.28 SD) and two times larger in Class 2 (0.30 SD). Overall, the effect of PRIMR in Kiswahili was 0.39 SD in Class 1 and 0.36 SD in Class 2. Outcomes were higher than those presented in the midterm analysis report,⁵ and higher than might have been expected given the school closures and other distractions during the March 2013 national election and the five-week strike of formal school teachers during June–July 2013.

⁴ Note that the Kiswahili EGRA varied from the English version to accommodate characteristics of the language.

⁵ Piper, B., & Mugenda, A. (2013). *The Primary Math and Reading (PRIMR) Initiative: Midterm impact evaluation*. Prepared under the USAID EdData II project, Task Order AID-623-M-11-00001. Research Triangle Park, NC: RTI International. Retrieved from <https://www.eddataglobal.org/countries/index.cfm?fuseaction=pubDetail&ID=486>

Exhibit ES2. Endline impact of PRIMR treatment on Kiswahili outcomes (selected measures)

Kiswahili EGRA subtasks	Overall			Class 1			Class 2		
	Treatment	Control	Effect size	Treatment	Control	Effect size	Treatment	Control	Effect size
Letter-sound fluency (correct letters per min.)	47.5	28.8	0.63	42.4	26.8	0.57	52.9	30.8	0.70
Syllable fluency (correct syllables per min.)	45.7	34.6	0.41	38.4	27.6	0.42	53.3	41.4	0.45
Oral reading fluency (correct words per min.)	27.4	20.6	0.35	20.9	13.9	0.41	34.0	27.3	0.35
Reading comprehension (% correct out of 5 questions)	35.9	25.8	0.34	25.6	14.9	0.45	46.6	36.5	0.32
Reading at benchmark (% of pupils reading 65 cwpm+)	15.9	6.7	0.27	7.2	0.8	0.28	24.9	12.5	0.30
Average effect size			0.35			0.39			0.36

As explained in the midterm report, given the very limited amount of time that the math learner books and teachers' guides were in classrooms before the midterm assessment, PRIMR was not convinced that the positive effect identified in the midterm assessment was due to the program.⁶ In 2013, however, the math materials were in schools on time when the school year began in January.

Exhibit ES3 presents the impact of PRIMR on mathematics outcomes on selected EGMA subtasks at the October 2013 endline. It shows a moderate effect of PRIMR on math overall of 0.16 SD for Class 1 and 0.26 SD for Class 2. PRIMR seemed to improve outcomes on the number identification (0.27 SD) and missing number (0.29 SD) subtasks, but had no effect on quantity discrimination (0.03 SD).⁷ The computational measures showed some effect, with higher outcomes in addition fluency or subtraction fluency. The impact was consistently larger in Class 2 than it was in Class 1. Word problems showed a small impact (0.13 SD).



Math lesson: Which is heavier than the other?

⁶ Piper & Mugenda, 2013.

⁷ The PRIMR mathematics program showed small or moderate impacts on all areas, except quantity discrimination. This task requires a developed number sense which remained difficult for many learners. In 2014, the program in this area was simplified as PRIMR moved away from scripted lesson plans to teachers' guides.

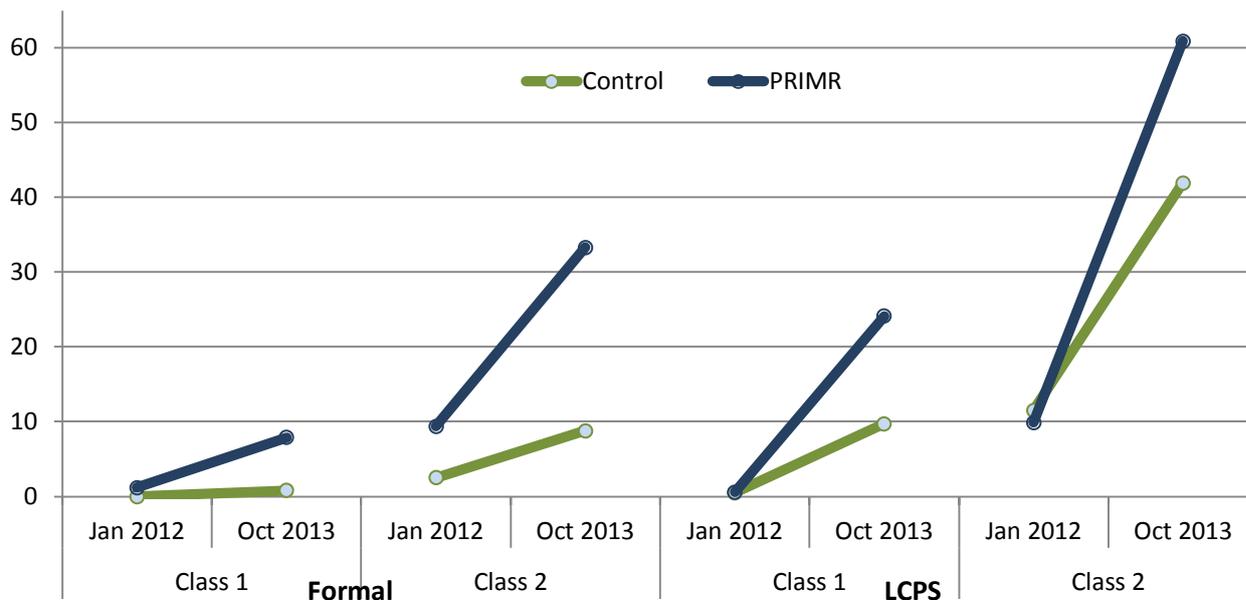
**Exhibit ES3. Endline impact of PRIMR treatment on mathematics outcomes
(selected measures)**

EGMA subtasks	Overall			Class 1			Class 2		
	PRIMR	Control	Effect size	PRIMR	Control	Effect size	PRIMR	Control	Effect size
Number identification (correct numbers per min.)	24.5	21.3	<i>0.27</i>	19.6	16.7	<i>0.31</i>	29.6	25.7	<i>0.33</i>
Quantity discrimination (% correct comparisons)	59.9	59.2	<i>0.03</i>	48.4	44.6	<i>0.16</i>	72.0	73.0	<i>-0.04</i>
Missing number (% correct)	43.5	36.8	<i>0.29</i>	32.8	28.6	<i>0.23</i>	54.7	44.6	<i>0.45</i>
Addition fluency (correct items per min.)	10.1	9.3	<i>0.17</i>	7.9	7.5	<i>0.10</i>	12.4	10.9	<i>0.33</i>
Subtraction fluency (correct items per min.)	7.1	6.2	<i>0.21</i>	5.4	4.7	<i>0.18</i>	8.9	7.5	<i>0.34</i>
Word problems (% of 5 items correct)	40.7	37.4	<i>0.13</i>	33.9	31.6	<i>0.10</i>	47.8	42.9	<i>0.18</i>
Average effect size			<i>0.20</i>			<i>0.16</i>			<i>0.26</i>

PRIMR and KNEC Benchmarks

Exhibit ES4 is a graphical representation of the impact of PRIMR on the percentage of pupils reading at the KNEC English benchmark for Class 2. These results indicate that treatment pupils in Classes 1 and 2 and in public and LCPS were making significant gains in literacy. The rates of increase between PRIMR and control schools were dramatically different, and in short, PRIMR was helping these pupils become literate much faster than the control public or LCPS were able to. For this figure, Class 1 was measured against a Class 2 benchmark, so gains were expected to be modest. Similarly large gains were found in Kiswahili.

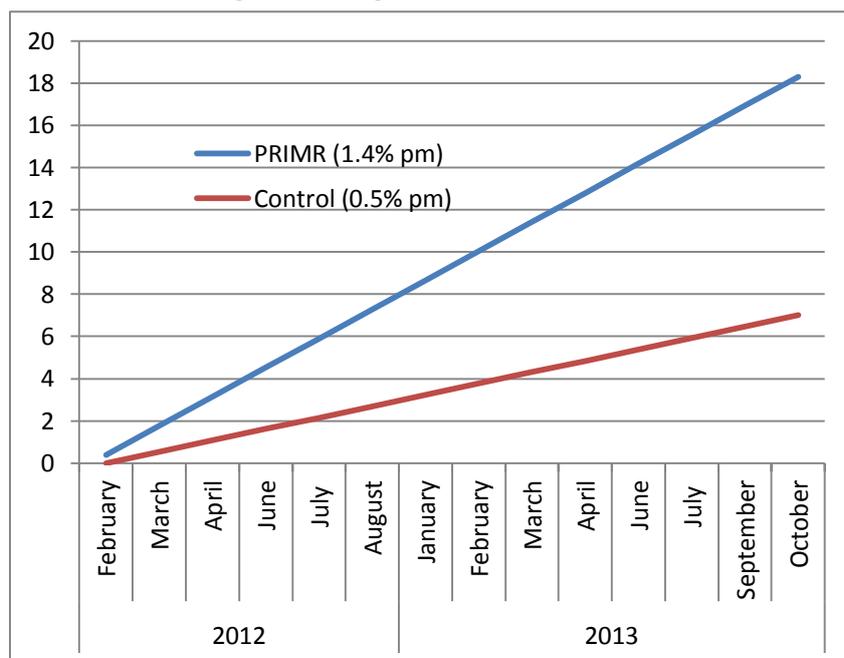
Exhibit ES4. Proportion of PRIMR and control pupils reading at English benchmark



Reading comprehension has proven difficult to improve in literacy programs.⁸ **Exhibit ES5** presents the increase in the proportion of Class 2 pupils able to comprehend at 80% or above, based on the reading comprehension subtask scores on the Kiswahili EGRA. The rate of increase in comprehension was nearly three times higher in PRIMR treatment schools than in control schools. These pupils were learning how to read *and* comprehend.

⁸ Piper, B., & Mugenda, A. (2012). *The Primary Math and Reading (PRIMR) Initiative baseline report*. Prepared for the U.S. Agency for International Development under the Education Data for Decision Making (EdData II) project, Task Order 13, No. AID-623-M-11-00001. Research Triangle Park, NC: RTI International. Retrieved from <https://www.eddataglobal.org/countries/index.cfm?fuseaction=pubDetail&ID=480>

Exhibit ES5. Rate of increase in the proportion of pupils reading with 80% or higher comprehension: Kiswahili, Class 2



Lessons Learned and Recommendations

Lessons Learned

This section presents key lessons learned from PRIMR in a variety of key areas focused on quality improvement in Kenya's primary schools.

1. **Training for TAC Tutors:** As the results show, TAC Tutors' visits to schools were critical for supporting teachers and improving pupil's outcomes. Proper training of TAC Tutors is essential so that they can effectively support teachers. The results also indicated that schools visited frequently were likely to have stronger pupil performance; hence, TAC Tutors should focus on making frequent and consistent classroom observations, even in the face of their heavy workload.
2. **Travel reimbursement structures:** PRIMR successfully facilitated TAC Tutors to visit classrooms. This involved a modest reimbursement that incentivized TAC Tutors to visit classrooms consistently. The method that was most successful reimbursed TAC Tutors against the proportion of teachers from whom they successfully uploaded classroom observational data on a monthly basis.
3. **Teacher training:** Training of teachers is a complex task that must assume teachers are adult learners who learn best by doing and interacting with other professionals. This implies that teacher training should be organized around modeling and practice, and that having brief trainings with follow-up and refresher meetings is more effective than longer trainings. The PRIMR training models improved when a "mastery checklist" was instituted, which provided a focus and a target for teachers to use when being trained.
4. **Distribution of classroom materials:** Distribution of materials to schools is a complex task. It requires accurate school enrollment data, prior planning, and a

sophisticated distribution network. Ensuring that materials reach the schools on time was an essential PRIMR task. The PRIMR Initiative showed that data can be collected from schools consistently. We hope that UNICEF school mapping data that became available in 2014 can be used to implement a high-quality mapping program to help the distribution process.

5. **Priorities in the school calendar:** During the implementation of PRIMR it became apparent that at certain times of the academic year, TAC Tutors were required to spend significant time away from the classroom. This occurred primarily during extracurricular activity periods. These are clearly important for a balanced learning experience for pupils, but better understanding of how these extracurricular activities could be organized so that they do not impede the TAC Tutors' ability to support instruction is important.
6. **In-service training:** During PRIMR assessments and implementation, the evidence suggested that most of the teachers supported by PRIMR had not attended professional development courses or in-service courses for several years since leaving college or becoming teachers. The PRIMR Initiative's regular professional development through training and other activities filled a demand for increased instructional practice and support. Collaboration between the Teachers' Service Commission (TSC) and the MoEST is essential for this to happen successfully.
7. **Changes in instructional approaches:** Old habits take time to change, and the shift from traditional teaching to more active, sequenced, pupil-focused approaches was the central focus of PRIMR. Some teachers continued to use two approaches concurrently at the beginning of PRIMR, in part because of concern about whether the lessons properly covered the material that would appear in the national end-of-year examinations. Advocacy was needed to change the mindset of some teachers.
8. **Instructional change takes time:** Any scale-up of PRIMR or other methods should recognize that large-scale instructional improvements are difficult. They require face to face time, practice, and ongoing feedback. The programs should be structured to allow for that.
9. **Incentives and choice matter.** Large-scale instructional improvement is expensive, so the incentives included should not necessarily be monetary. But programs that introduce choice and competition as a prerequisite for participation are more likely to have teachers implementing consistently, and to see the program as something that they have ownership and control over. This is essential for them to implement it well.
10. **Understanding costs is essential.** The ICT program in Kisumu County showed that while effectiveness is possible, costs matter more. Without taking into account the cost of interventions, poor policy decisions are likely. Similarly, in the area of books, the PRIMR Initiative showed that book costs are significantly higher in Kenya than they should be. Active policy advocacy is necessary to ensure that pupils get high-quality materials for low cost.

11. **Materials revision should be built in.** PRIMR's materials were significantly better in 2014 than they were in 2012. Kenya's scale-up of PRIMR will benefit because PRIMR had sufficient time to innovate, improve, and change. This is essential part of the design of successful programs.

Recommendations

The following recommendations came from the endline assessment as well as an overall evaluation of PRIMR implementation. Some of them are specific to Kenya at the policy level, and others are relevant for the anticipated USAID *Tusome* literacy scale-up or the Global Partnership for Education mathematics scale-up.

1. **Results and scale-up:** PRIMR's results showed remarkable improvements in pupils' literacy and numeracy abilities, especially for pupils starting at the lowest levels of literacy and numeracy. The MoEST should therefore consider scaling up PRIMR activities to improve the quality of instruction in Class 1 and 2 in the *Tusome* program.
2. **Careful scale-up:** While the PRIMR findings lead to optimism that the *Tusome* program will be built on a successful policy and materials base, utilizing care in the design of *Tusome* is a key recommendation. Building on the incentives, the interest, and the concern that each county has in improving the quality of education might suggest that a staggered implementation would lead to higher quality educational outcomes.
3. **Girls' performance:** The results indicated that, overall, girls were performing at the same level as—if not better than—boys, especially in literacy. Teachers should be trained in strategies for motivating girls so that they remain competitive as they move to upper primary.
4. **Zonal size:** The results showed that TAC Tutors in large zones were less likely to have a significant an impact on pupil outcomes than those in smaller zones. Considerations should be made to limit the number of schools for which the TAC Tutors are responsible. This would make TAC Tutors more effective in supporting teachers frequently.
5. **Textbook ratio:** Provision of books to pupils at a 1:1 ratio is paramount in improving pupils' literacy and numeracy. The PRIMR analysis suggested that the government's current allocation would be enough to have a 1:1 ratio of books for all pupils in Kenya at low cost, if the cost of the books was more competitive.
6. **Advocacy and uptake:** There should be advocacy of PRIMR's success through sharing of research results with a wider circle of stakeholders, including the MoEST and Semi-Autonomous Government Agencies (SAGAs).
7. **Language of instruction:** The language of instruction remains a complex issue for the Kenyan education system. Any attempt to scale up PRIMR activities without resolving this issue is likely to increase complexity during the implementation. A parallel study funded by the DFID Rural Expansion Programme, which is supplying instructional materials and support in two mother tongues, will provide evidence as

to the effectiveness of mother tongue compared with a basic instructional support program.

8. **Textbook policies:** The findings on cost and impact suggest a need to consider the guidelines regarding vetting and selection of textbooks for use in schools. The complexity of multilingual literacy and numeracy instruction requires vetting guidelines that are tailored to the instructional characteristics of Kenya's system. In addition, the PRIMR team recommends revising the textbook policy to allow for an evaluation and design process that will lead to higher quality materials produced by publishers in Kenya.
9. **Pre-service reform:** The PRIMR policy study on pre-service reform suggests that the pre-service education and training sector should be reorganized fundamentally. The focus on early literacy and numeracy is lacking, and the mismatch in the curriculum used in the pre-service sector and the Kenya Institute of Curriculum Development (KICD) school curriculum is exacerbated by the limited experience that pre-service lecturers have with the instructional realities of primary classrooms, particularly in lower primary. This suggests a revision of this subsector to ensure higher quality literacy and numeracy outcomes.
10. **Inclusion of low-cost private schools:** The PRIMR findings showed that the LCPSs in Kenya do contribute to improving the quality of education in Kenya. A PRIMR policy study carried out for the MoEST suggested a range of options to capitalize on the subsector, from a limited-choice model, to a relaxed registration model, and the status quo. PRIMR recommends that the LCPSs be seen as an asset to the Kenyan system, and that they be used to put more pressure on existing schools to produce better learning outcomes for pupils.
11. **Abolish or revise termly examinations:** Most of the schools with which PRIMR worked purchased examinations from printers in Nairobi and other towns. These exams were not closely related to the KICD syllabus, were not targeted to the content in the most frequently used books, and emphasized items that were nonessential to successful literacy and numeracy acquisition. Many zones set their own exams, which is commendable. That should be the required practice, or a single exam should be set.
12. **Daily literacy and numeracy instruction:** Lesson time could be revised to accommodate more literacy and numeracy instructional time during the week. This is true not only because Kenya's literacy and numeracy allocations are paltry compared to the rest of East Africa, but also because of the evidence that in control schools, pupils spent very little time actually reading texts.
13. **Teacher assignments:** PRIMR advocated that the transfer of teachers trained in its methods should be minimized to avoid the need for repeated onboarding and introductory training on a rolling basis. The TSC worked tirelessly to ensure that transfers were kept to a minimum, and it is hoped that this type of accommodation can continue in future programming.

14. ICT for instructional improvement. PRIMR's findings suggested that the most effective ICT focused on helping teachers improve instruction. This required the target of ICT not to be just the hardware, or just the content, but instead the connections among hardware, content, and the instructional core. The advantage to ICT in Kenya is that it can be easily accessible, and it can help the most complicated part of educational reform, which is the interactions among teachers, students and content. Investments targeted thoughtfully at improving that core in simple and manageable ways is important.

Implementing these recommendations would increase the likelihood of PRIMR and any successor program having high levels of uptake by teachers and head teachers, as well as enthusiasm for the program from the County Education Offices and TSC offices. Most critically, the objective ensuring that all pupils are literate and numerate by Class 2 would be realized.

I. Introduction

This final report for the USAID/Kenya Primary Math and Reading (PRIMR) Initiative is a digest of the activities and accomplishments of the complete program, from startup in August 2011 to closeout in August 2014. Thus, it explains the design of this randomized controlled trial (RCT), including its unique internal experiments; the responsible individuals and organizations; and the intervention participants and the major components of the project implementation. As hoped, PRIMR proved to be fertile ground for investigating a host of education-related issues never previously investigated in sub-Saharan Africa; and it built the capacity of teachers, trainers, instructional coaches, and Ministry officials at all levels in a cost-effective way that has strong potential for sustaining instructional improvements in reading and mathematics in Kenya's primary schools. PRIMR's data sets, findings, and lessons learned should prove valuable for other education programming in the region.

At USAID/Kenya's request, this document also incorporates the final quarterly report for the program, with specific information about progress against indicators and closeout activities for the period April–June 2014.

The report is organized as follows. The remainder of this section introduces PRIMR's purpose, scope, activities, and key players. Section 2 describes the groundwork laid for the intervention, especially the development and distribution of continually revised teaching and learning materials for English, Kiswahili, and math. Section 3 highlights the ways in which the program supported coaches and teachers in learning—and then correctly using—new and effective techniques for teaching literacy and numeracy. Section 4 covers an “experiment within an experiment,” a study of the use of several types of information and communication technology (ICT) in selected schools in Kisumu County. Next, because a key aspect of PRIMR was building the capacity of the Ministry of Education, Science and Technology (MoEST) and its semi-autonomous units to carry out policy research and to evaluate the conditions necessary to implement and sustain a national-scale reading and math program, Section 5 discusses PRIMR's involvement with the MoEST and education issues at the national level.

As a randomized controlled trial, PRIMR's directive was to carefully document every aspect of the intervention and corresponding results in terms of pupil performance, cost, cost-effectiveness, suitability for scale-up, and sustainability. Section 6 presents the results of an impact evaluation regarding these points.

To conclude, Sections 7, 8, and 9 present notes about parallel programming sponsored by the British Department for International Development (DFID/Kenya); progress on activities specific to the April–June 2014 quarter; and overall lessons learned and recommendations about PRIMR and future education programming in Kenya.

I.1 Description of the PRIMR Initiative

The PRIMR Initiative was borne out of the concern to improve the quality of reading and numeracy in early grades in Kenya. It was a partnership between the Kenyan Ministry of Education, Science, and Technology and the United States Agency for International

Development (USAID). It was implemented by RTI International from August 2011 to August 2014, as a task order under USAID's Education Data for Decision Making (EdData II) project, which is focused on using data to improve education decision-making, and in the case of PRIMR, student outcomes.

Specifically, PRIMR aimed at achieving the following outcomes:

- Grade-appropriate reading fluency and comprehension increased for children in Classes (grades) 1 and 2;
- Grade-appropriate mathematical abilities increased for children in Classes 1 and 2;
- MoEST equipped and prepared to scale up successful Early Grade Reading and Mathematics Assessment (EGRA/EGMA) features and approaches.

Although this final report covers the implementation and accomplishments of the USAID-funded activities, two efforts underwritten by DFID/Kenya were closely intertwined with USAID's: the Rural Expansion Programme (Dec 2012–Feb 2015) and National Tablets Programme (Aug 2013–Feb 2015). These DFID-sponsored companion activities are mentioned throughout, and more details are presented near the end of the report (Section 7).

Below we describe in more detail the experimental design and the research questions investigated.

1.2 Research Design

The PRIMR Initiative was both an intervention and a research project, with the objective of building capacity throughout the education system and answering important questions concerning early grade literacy and mathematics education in Kenya. It had three elements, all highly dependent on quality data: (1) the use of data from student assessments to determine and improve the effectiveness of reading and math interventions, with particular emphasis on gender equity; (2) the use of classroom observation data to inform instructional approaches that helped fast-track student achievements in reading and math; and (3) in-person classroom observation and instructional feedback, as well as cluster-based discussions and critical reflections among Teachers' Advisory Centre (TAC) Tutors and instructional coaches,⁹ teachers, and head teachers that informed policy dialogue with the MoEST. PRIMR core activities included the following:

- Developing an experimental design that consisted of a baseline, midterm, and endline evaluation alongside appropriate data collection tools aimed at collecting periodic data to assess and inform initiative activities.
- Designing a scope and sequence of Kenyan curriculum-based content in Kiswahili, English, and mathematics.
- Preparing teachers' guides for Classes 1 and 2 for the three subjects.
- Training TAC Tutors, coaches, head teachers, and teachers to implement lessons.
- Providing tailor-made instructional materials integrated with teachers' guides.

⁹ TAC Tutors are employees of the Teachers' Service Commission whose job it is provide pedagogical support to teachers in formal government-run schools. Instructional coaches played the same role in PRIMR low-cost private schools. The instructional coaches were hired and managed by the CfBT Education Trust.

- Developing teachers' capacity to employ continuous assessment methods, integrated into core content.
- Developing and using EGRA, EGMA, and Snapshot of School Management Effectiveness (SSME) measures to analyze program impact, with periodic revision of program materials.
- Supporting the MoEST with policy analyses aimed at helping them determine the structures and policies necessary to improve student outcomes in early primary levels across Kenya.

The research design was a randomized controlled trial that sought to better understand how the MoEST could use data and research-based teaching methods and materials to improve students' literacy and mathematics knowledge. The research study was designed to answer the following questions (see also Section 6.6):

1. What is the impact of a targeted instructional improvement initiative on student achievement?
Measure: Statistically significant differences in the scores of children in treatment and control schools over the life of the project.
2. What ratio of instructional coaches or TAC Tutors is most effective and most cost efficient?
Measure: Statistically significant differences in the improvement scores of children in schools where the coach/school ratio was 10:1 as opposed to 15:1.
3. How does the impact of an instructional improvement initiative differ by urban and rural location?
Measure: Differences in scores between urban and rural schools.
4. How does the impact of the initiative differ by formal or nonformal¹⁰ school status?
Measure: Differences in scores of pupils who attended low-cost private education institutions and those who attended public schools.
5. What duration of initial investment is required to successfully improve student outcomes?
Measure: Statistically significant differences in the improvement scores of children who received one year of treatment or two years of treatment (Cohorts 1 and 2).
6. Are information and communication technology interventions more effective than more traditional approaches? Do they add value to traditional methods? Are they cost-effective?
Measure: Differences in scores among scores of pupils who got the three ICT interventions and the control group.

¹⁰ *Formal* schools (also *public* or *government* schools) were those operating under the auspices of the MoEST. *Nonformal* schools, which later became known more specifically as *low-cost private schools* (LCPSs) and in some cases, *complementary schools*, typically were operating in peri-urban settlements in Nairobi, in areas not served by government school facilities or personnel. Although all these terms were applied to private schools at various points during PRIMR, we use "LCPS" in the remainder of this report.

7. How can successful approaches to increasing learning outcomes be scaled up to a national level?

Measure: Review of education policies regarding instruction in reading and mathematics; use of PRIMR results to advocate for scale-up of improved pedagogical strategies. Discussions included MoEST, interested donors, and nongovernmental organizations (NGOs) and other stakeholders.

To answer these questions, a design was developed (see **Exhibit I**) that consisted of three cohorts of schools. The exhibit shows the design by year and cohort, including an ICT study in Kisumu County. PRIMR was designed to compare government schools and LCPSs to control schools that received no treatment. Each year a new cohort was added, supporting the project's ability to understand issues around scaling up. In the final year, 2014, the control schools became Cohort 3 and began receiving the full PRIMR treatment. The ICT study (explained in more detail in Section 4) ran for one full school year (2013) and compared the impact and cost effectiveness of three different ICT treatments to support improving student outcomes in early literacy only.

Exhibit I. PRIMR Initiative research design

School type	Experimental group	Cohort	No. of schools	2011	2012			2013			2014
				Term 3	Term 1	Term 2	Term 3	Term 1	Term 2	Term 3	Term 1
Government	Treatment	1	66								
		2	65								
	Control	3	51								
ICT	PRIMR + Coach	2	30								
	PRIMR + Teacher	2	33								
	PRIMR + e-reader	2	30								
	Control	3	43								
Low-cost private	LCPS 10:1*	1	29								
	LCPS 10:1*	2	60								
	LCPS 15:1*	1	30								
	LCPS 15:1*	2	60								
	Control*	3	50								

Key

	Continuous assessments for PRIMR schools
	Intervention under way in PRIMR school
	Sample-based Early Grade Reading Assessment
	Ratio of schools to coaches

1.3 School Selection and Location

The PRIMR Initiative worked with a total of 547 schools during 2011–2014 (see *Exhibit 2*), selected from Nairobi, Nakuru, Kiambu, Murang’a, and Kisumu.

Exhibit 2. USAID PRIMR schools, 2012–2014

School type	Total number of schools, by year			Total schools
	2012	2013	2014	
Formal schools	66	131	94	318
Low-cost private schools	59	179	50	229
Total	125	403	144	547

Phases and Cohort Assignments

For the three phases, during the first full school year of the project (2012), a total of 66 government schools and 59 LCPSs became Cohort 1. The LCPS schools had two strands: 30 schools had two instructional coaches each (15:1 ratio) and another 30 schools had 3 instructional coaches (10:1 ratio). Of these, one school burned down; thus, a total of 59 schools remained in the project.

During the second year of PRIMR (2013), an additional 65 government schools and 120 LCPSs joined the program as Cohort 2, bringing the total number of government schools to 131 and LCPSs to 179. Half of the LCPSs that joined the initiative in 2013 (60 schools) had a school/coach ratio of 10:1 and the other 60 schools had a school/coach ratio of 15:1. During the same year, 80 schools from Kisumu County joined the ICT study portion of the Initiative, with 20 of those schools in each of three ICT interventions, and the final 20 in a control group. In 2014, those 20 control schools as well as the other 33 schools in the treatment zones, were provided the treatment.

Finally, 94 formal schools (including 43 for the ICT study control schools) and 50 LCPSs joined the program in the last year of implementation. Cohort 3 comprised schools that were initially control schools and had been scheduled to receive the intervention in 2014. However, it was decided that all schools—totaling 547, including those under Cohorts 1 and 2—would receive the PRIMR Initiative intervention in 2014, given how much the final version of the learning materials had changed from 2013.

Sampling of Formal Schools and Low-Cost Private Schools

As noted, the selected schools were categorized by formal (government) schools and low-cost private schools, with all the LCPSs being located in Nairobi County.

The selection of LCPSs first involved developing a sampling frame using the Kenya Independent Schools Association (KISA) list and a list of LCPSs that RTI had generated in June 2011 for purposes of administering a pre-PRIMR EGRA. The aggregate of schools on these lists was then organized into clusters of schools 10 and 15. This resulted in a total of 22 10:1 clusters and 15 15:1 clusters. These were located across Nairobi’s divisions, with careful attention paid to the geographic location of clusters in various treatment groups in an attempt to avoid “leakage” of the treatment. The PRIMR team randomly selected 12 10:1

and 8 15:1 clusters and then randomly assigned them into Cohort 1, Cohort 2, and Cohort 3 groups, stratifying by geographic location.

For formal schools, PRIMR initially targeted the counties of Nairobi, Kiambu, Murang’a, and Nakuru—which have municipalities using Kiswahili as a primary language that did not overlap with other USAID education activities in Kenya. From the Kiswahili-primary areas, all eligible districts were selected.

The districts also had to have TAC Tutors at a ratio of less than one per 25 schools, and eligible zones were ranked by the self-determined quality of the TAC Tutor. PRIMR staff visited each of these districts and municipalities to determine whether they were interested in PRIMR participation, given the arduous demands of the project related to TAC Tutor assignment and other issues. All districts remained interested. Therefore, the project team randomly assigned districts and zones to Cohort 1, 2, or 3, in the manner shown in **Exhibit 3**.

Exhibit 3. PRIMR formal school sample, by cohort and location

	Cohort 1 – starting 2012	Cohort 2 – starting 2013	Cohort 3 – starting 2014
Target schools	70	70	50
Actual schools	73	64	51
Districts/Zones	5	5	3

1.4 Capacity Building and Sustainability

GOK Partners

In the implementation, RTI worked closely with the MoEST, mainly through a Programme Development and Implementation Team (PDIT). The PDIT consisted of representatives from MoEST and its constituent Semi-Autonomous Government Agencies (SAGAs): the Kenya Institute of Curriculum Development (KICD), Kenya National Examination Council (KNEC), Teachers’ Service Commission (TSC), Kenya Education Management Institute (KEMI), and Kenya Institute of Special Education (KISE).

The PDIT

Professor George Godia, then Education Secretary at the MoEST and later the Permanent Secretary at the MOEST, appointed the PRIMR coordinating team, the PDIT, in 2011 at the start of the Initiative. Its membership was drawn from key MoEST directorates; for example, participants included Kiswahili, English, and math subject specialists from within the Directorate of Quality Assurance and Standards (DQAS); Basic Education; Policy, Partnership, and East Africa Community Affairs (DPP&EACA); and Field and Other Services, as well as a representative from the Education Secretary’s Office. As noted above, other representatives were also appointed from the relevant SAGAs, such as English, Kiswahili, and math specialists from the KICD, KNEC, KEMI, KISE, and TSC.

The PRIMR team worked with PDIT members to ensure that the following were done, with this approximate chronology:

- Development of **“scope and sequence”** for the new type of early grade reading and mathematics instruction that would take place in Kenya under PRIMR Initiative. The goal was to determine what aspects of the Kenyan language and reading curriculum pupils needed to learn at their grade level, and in what order. PDIT members participated in a workshop in October 2011 at which their capacity to develop the scope and sequence was enhanced by RTI technical advisors and a team of consultants from the Kenyan universities. The resulting PRIMR scope and sequence then guided the content for new pupil textbooks, teacher guides, and supplementary materials developed under PRIMR for Kiswahili, English, and mathematics, both Class 1 and Class 2.
- Participation in a strategic aspect of PRIMR’s design: **intensive initial and recurring training** in teaching reading and mathematics for all classroom personnel from the PRIMR treatment schools. These were TAC Tutors who supported formal schools; instructional coaches working with teachers in LCPSs; head teachers; and classroom teachers. PDIT members participated in the PRIMR workshops that took place each term, enabling them to learn about PRIMR’s implementation of the early grade reading and early grade math intervention, as well as enhancing their own support for program monitoring.
- For each program year, PDIT members discussed with the PRIMR senior management team the Initiative’s **annual plan**, giving feedback and approval before the plan moved forward.
- PDIT members were instrumental in **coordinating the flow of participation** of the representatives from the MoEST and SAGAs in all key PRIMR activities. This included processing invitation letters to workshops and other events; approving data collection for the EGRA, EGMA, and SSME surveys at baseline, midterm, and endline, as well as for “mini-EGRAs” for small-scale periodic monitoring; observing classrooms; reviewing key PRIMR reports and giving input (especially for the baseline, midterm, and endline reports); and attending all PRIMR workshops and bi-monthly meetings of the PRIMR senior management team.

From this consistent participation and coordination of PRIMR activities, the capacity of PDIT members to implement early grade reading and early grade math programs substantially increased. It should be noted that this was the first time key MoEST staff had been involved in consistent coordination and implementation of such a program over a sustained period (in this case, about three years). These PDIT members are currently the key personnel designing the new Global Partnership for Education (GPE) grant design, meaning that the experience in PRIMR gave them the expertise and knowledge to help the MoEST implement larger-scale initiatives.



PDIT review of endline findings

During the course of PRIMR Initiative implementation, the MoEST also arranged for the Center for Mathematics and Science Teaching in Africa (CEMASTEA) to become part of the PDIT, as they became instrumental in supporting implementation of the math portion of the program in the country.

Primary Teacher Training Colleges (PTTCs)

The MoEST appointed representatives from the PTTCs to attend various events in the interest of fully involving these pre-service training institutions in PRIMR's methods and policies. PTTC educators attended the project's scope and sequence workshop (see Section 2.1); participated in the official dissemination of the midterm report in September 2013; and engaged in other activities and studies.

1.5 Partner Organizations

The PRIMR team oversaw the work of several national and international organizations assigned to implement major components of the Initiative.

Worldreader

For the implementation of the PRIMR ICT study in Kisumu County, RTI subcontracted with Worldreader to manage the e-reader subcomponent. Under this program, 1,080 e-readers were distributed to 10 schools in Otonglo zone and another 10 schools in Kodingo zone, both in Kisumu County. The Worldreader contributions were distributing and managing e-readers; loading e-readers with the required number of book titles and updating them each term; training TAC Tutors and teachers, especially in e-reader zones; and supervising TAC Tutors. Worldreader provided a total of \$967,213 in leveraging. This included e-books uploaded to the tablets in English, Kiswahili and Math, as well as reduced prices on the e-books, tablet cases and lights.

Worldreader also was in charge of other implementation-related activities, such as reading contests, and zonal and TAC Tutor monthly meetings (described in Section 3). To engender community participation, Worldreader undertook community sensitization and awareness of the program and in particular, community collaboration in ensuring that e-readers were safe for the pupils to use. The technical staff ensured that teachers were well trained to support pupils in using e-readers and they were on hand to offer technical support in cases of e-reader breakdowns.

CfBT Education Trust (formerly Centre for British Teachers)

As indicated earlier, CfBT partnered with RTI in the implementation of PRIMR in LCPSs. Whereas for formal schools, TAC Tutors were in charge of zones, through CfBT, RTI hired coaches to be in charge of teacher support in school clusters. The role of coaches in clusters was similar to that of TAC Tutors in zones. Apart from supervising and supporting teachers, they led reading and math contests and exhibitions, and cluster meetings. On a monthly basis, the CfBT-supported coaches participated in debriefing meetings that were centrally held. All activities were geared toward improving literacy and numeracy outcomes.

SIL International

RTI collaborated with consultants and literacy organizations on some aspects of the development of the teaching and learning materials. For example, SIL International contributed to the scope and sequence activities, development of the initial lesson plans, and lesson plan revisions in subsequent years, with particular focus on Kiswahili. SIL also later supported the development of instructional materials for mother-tongue programs in the Lubukusu and Kikamba languages, funded under the DFID Rural Expansion Programme.

Civil Society – Elimu Yetu Coalition (EYC)

RTI is a member of the Elimu Yetu Coalition (EYC), which is a forum recognized by over 100 organizations for policy engagement with the Kenyan government on issues related to education. PRIMR engaged with the EYC on two main policy issues:

- The Fifth Civil Society Organization Conference on Education for All ICT for Equalizing Education Opportunities for all in Kenya, which was conducted at KICD, 25–27 September 2013. PRIMR and EYC’s participation in policy issues continued through development of a communique submitted to MoEST, as an effort to influence the direction the Ministry takes on issues of ICT, especially the need to use ICT for instructional support.
- PRIMR staff wrote and submitted an article to the EYC newsletter in November 2013 focused on ICT for equalizing education opportunities for all in Kenya. The article aimed to inform and advocate for the use of ICT for improving classroom instruction, and was titled “Primary Maths and Reading (PRIMR) Kisumu County Information and Communication Technology (ICT) Pilot: 2013 Results.”

Multilingual Education Network (MLEN)

PRIMR, through RTI, joined the Multilingual Education Network, an organization that fosters use of first/indigenous languages in education settings. Its membership encompasses universities, NGOs, and government agencies. Examples of member organizations are Kenya University, United States International University, University of Nairobi, Bible Translation and Learning Institute, Education Development Center, KICD, Save the Children, World Vision, and Partners in Literacy Ministry. Through the network, RTI shared PRIMR lessons learned, as well as best practices in research and material development, since it has been involved in research on reading in local languages such as Kiswahili, Lubukusu, Kikamba, Luo, and Gikuyu.

RTI participated in MLEN’s International Mother Language Day celebrations held at Kenyatta University in February 2014. The keynote address on “African Languages in Education and Development” was delivered by Prof. Kithaka wa Mberia of the University of Nairobi.

RTI and PRIMR also participated in a meeting of network members in July 2014 at BTL Christian International Conference Centre in Ruiru. During this meeting, RTI presented on the mother-tongue-reading aspects of the PRIMR Initiative. The presentation highlighted PRIMR’s impact on pupil performance in reading, and the key elements behind the tremendous success that the program had posted with regard to early grade literacy.

In addition to the English and Kiswahili, results, the presentation shared experiences about the DFID-funded ongoing study on the Kikamba and Lubukusu languages in Machakos and Bungoma counties, respectively (Rural Expansion Programme). This initiative, like the USAID-funded study, is based on the key elements of (1) development of instructional materials and teachers' guides, (2) teacher training, and (3) instructional support in the classroom.

2. Development of Materials

The PRIMR Initiative's main objective was to improve the reading and math outcomes for pupils in Classes 1 and 2. Because low-cost, syllabus based materials that were organized in a structured and scaffolded manner to ensure early learning success were not available, reaching these outcomes required developing a set of instructional materials in English, Kiswahili, and math, as well as training and supporting teachers to implement the new approach to instruction. In this section we explain the activities undertaken by the PRIMR Initiative to create and then improve the quality of materials.

2.1 Scope and Sequence Development

The first year of the PRIMR Initiative focused on the initial development of teaching and learning materials for English, Kiswahili, and math for Class 1. The first step in the process for each subject was to develop a scope and sequence. As described in the introduction (Section 1.4), the scope and sequence can be thought of as a road map for the content or skills that will be taught (scope) and when in the school year they will be taught (sequence). This road map was to serve as the guide for materials development.

The PRIMR Initiative developed scopes and sequences for all three subjects in a two-step process, beginning with English and Kiswahili. These language scopes and sequences were developed together since the languages interact closely. The mathematics scope and sequence workshop followed closely afterward. For each subject, a workshop was held with the MoEST and key members of the SAGAs and other stakeholders, where key decisions were made about what to teach and in what sequence.

Finally, given that Kenyan primary school teachers go through a two-year teacher training course in the PTTCs, PRIMR found it prudent to involve the teacher trainers in scope and sequence development right from the start during the October–November 2011 workshops. The understanding was that the involvement of the teacher trainers in early grade pedagogical skills would have an effect on the pre-service teacher training practice. For the scope and sequence workshop for English and Kiswahili, the ministry nominated two teacher trainers from Kaimosi Teacher College to serve as subject representatives.

Kiswahili and English Scope and Sequence Development

During October 2011, a technical team met at a conference center in Naivasha to discuss how to structure the learning materials for students in Kiswahili and English, as well as the accompanying instructional guides for teachers. The MoEST invited key personnel from several directorates, KICD, and other stakeholders.



Dr. Sylvia Linan-Thompson discussing the scope and sequence of Kiswahili and English.



Mrs. Grace Ngaca leading the team in investigating how to create efficient lesson plans.

The workshop focused on two main topics: (1) understanding and setting the approach to teaching the process of reading, and (2) the sequence of teaching letters and skills necessary to learn to read. The approach that PRIMR had proposed for teaching reading instruction was based on research synthesized in 2000 by the US National Reading Panel.¹¹ This approach has five essential components:

1. phonological awareness
2. alphabetic principle
3. fluency
4. vocabulary
5. comprehension

After the approach to reading was confirmed, RTI expert Dr. Sylvia Linan-Thompson led participants in a discussion on how to decide the sequence for teaching letters in Kiswahili, followed by the sequence for teaching letters in English. The sequence selected for Kiswahili was based on the frequency of Kiswahili letters in grade-level texts, while the English sequence was based on a combination of the order of Kiswahili letters taught in Kiswahili and the frequency of English letters in grade-level texts. Basing the English sequence on the Kiswahili sequence would allow the students to learn the letters and sounds in a language with which they were more familiar first, and then use that knowledge to more efficiently learn the letters and sounds of English.

It was decided at the workshop that students would need time to learn English vocabulary and therefore would spend most of their first term of English developing oral language skills, while they learned reading skills like letter sounds and word reading in Kiswahili.

Comprehension and vocabulary would be taught in both languages in the first term; however, in English, this would all be taught orally. Near the end of the first term, students would begin learning English letters and sounds that they had previously learned in Kiswahili,

¹¹ National Institute of Child Health and Human Development [US]. (2000). *Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction: Reports of the subgroups* (National Institutes of Health [NIH] Publication No. 00-4754). Washington, DC: NIH.

allowing teachers to teach letters that had different sounds in English while only reviewing letter sounds that were the same in both languages. This would make learning letter–sound correspondence in two languages much more efficient.

Along with deciding on the sequence of letters, the team began to develop a structured set of syllables and words to be used for phonological awareness and alphabetic principle activities. The same syllables and words then would be used in controlled-text stories that could be built into a structured and sequential set of materials for students. The expectation was that the PRIMR technical team and subject experts in a subject panel would continue that process after the workshop and expand on what the workshop participants decided.

Additionally, the participants discussed the relationship between the PRIMR Initiative’s work and the KICD syllabus. It was agreed that the purpose of PRIMR was to develop materials that would better teach children how to read. PRIMR planned to make that purpose fit into the KICD syllabus, and to ensure that the materials would fit into the themes assigned by KICD.

There was also initial concern about how teachers would interact with the new materials. The team discussed ways to make the lesson plans fit closely into the Kenyan environment. It was agreed that terminology that would not be meaningful to teachers would be changed and the formats of the lesson plans shifted to fit what teachers were used to, as much as possible. That said, the workshop team agreed that it would be useful to show teachers that some things could be done differently to improve outcomes.

Finally, the workshop attendees resolved to ask a group of MoEST officials, with heavy KICD participation, to review the outcomes of the material development workshops. PRIMR’s hope was that MoEST and KICD experts would be involved throughout the process. The technical team met at the RTI offices from October 20 through the beginning of December 2011. The outcome was a sequenced set of materials for teachers and students for Kiswahili and English.

Mathematics Scope and Sequence Development

In October 2011, representatives from the MoEST, KICD, and RTI, as well as teachers, teacher trainers, and TAC Tutors, met at KICD’s offices to develop a scope and sequence for mathematics in Kenya. As with the English and Kiswahili scope and sequence event, the MoEST invited key personnel from KICD and several directorates, plus other stakeholders, to this workshop. The discussion opened with a review of the findings from a 2009 EGMA study in Malindi, along with some illustrations from an October 2011 pre-pilot EGMA study in Kibera. The results showed that the children scored well on the counting and shape discrimination sections, but struggled with more complex math skills, in particular simple addition and subtraction and word problems.

RTI mathematics consultant Dr. David Chard facilitated the main scope and sequence discussions. He presented research on the international experience with developing a carefully designed mathematics program. The findings suggested that a good program for Kenya should include the KICD syllabus, focus on vocabulary and reasoning, ensure that children have procedural fluency and flexibility, and ensure that students learn mathematical concepts and models. The outcomes of the workshop can be summarized as follows:

- Participants agreed that the goal of instruction is to help develop number sense and fluidity with using and manipulating numbers, while at the same time ensuring fluency in basic operations.
- The three core outputs of the math program were determined to be a scope and sequence matrix for Classes 1 and 2, a set of focused and targeted lesson plans (eventually teachers' guides) designed in a way that would be familiar to Kenyan teachers, and a student workbook that would include more practice and content than the typical mathematics book on the market, organized logically to take students through the syllabus efficiently.
- The participants agreed that the substantive strands, to be taught every day or every two days, and found within the Kenyan KICD syllabus, should be:
 - Counting
 - Magnitude and Comparison
 - Place Value and Composing/Decomposing
 - Number Patterns
 - Translation (representation)/Notation
 - Equivalence
 - Operations
 - Measurement (embedded)
 - Geometry (modestly emphasized, as children were doing quite well on this already)
- Participants also agreed that it was important for children to gain skills in Procedural Fluency, Adaptive Reasoning, Strategic Competence, and Conceptual Understanding. This meant that, compared to current typical instruction, there would be more emphasis on the thinking behind how operations work, with a focus on ensuring that children have these skills.
- To facilitate this plan for daily teaching of skills, the workshop team decided that the children should be provided with mathematics workbooks. These workbooks would allow all children to practice—not just in procedures and facts, but more on the thinking necessary to learn math more effectively.
- The team worked very hard to develop a lesson plan template that would allow for the innovations of the Kenya PRIMR Initiative (including the lesson cycle around the teacher-and-student modeling technique called “I do / We do / You do”), but that also would look like the lesson plans that teachers were supposed to develop themselves. This lesson plan framework was adapted for the PRIMR lesson plan process.
- Participants requested that the technical team bring back another round of materials to KICD and the MoEST for their review, to ensure buy-in about the materials from the experts going forward.

2.2 Instructional Materials Development

Immediately following the scope and sequence development workshops, materials development teams began work to finalize the framework and develop lesson plans and pupil books in time for piloting in the 2012 school year (i.e., January–November 2012). English and Kiswahili lesson plans were developed mainly in the PRIMR Nairobi office with support and review by reading experts and subject panelists. Math instructional materials were developed in Kenya with support from Dr. Chard.

The instructional techniques in the lesson plans were based on research with students struggling to learn reading and mathematics. They consisted of direct, explicit, and systematic approaches:

- Direct – a lesson cycle where teachers model a new concept, guide students in practicing, allow students to practice on their own to assess their understanding, and give feedback.
- Explicit – the direct explanation of new skills and concepts using concise simple language to ensure students know exactly what they are to focus on and learn.
- Systematic – a very carefully planned sequence of instruction where skills build on each other and the teacher ensures that students acquire the prerequisite knowledge to understand the new skill.

The instructional materials that PRIMR developed for 2012 for each subject included two books: a teachers' guide with daily lesson plans, and a pupil book for students to use to practice new skills. The content of the teachers' guide and pupil book were carefully linked so that what teachers were teaching was the same as what pupils were practicing. Each subject included 10 weeks of lessons for each of the three terms, for a total of 150 lessons for the school year. The lessons were originally very structured to ensure teachers would have clear examples of direct and explicit language to be used during instruction. These materials were revised several times, and during each revision, the amount of structure and specific wording provided for the teacher declined. The PRIMR team found that while many teachers appreciated the scaffolding provided by the structure, others struggled to read the new content. As a result, the 2014 version of the PRIMR materials was not scripted at all.

Lesson Plan Development – English and Kiswahili

The technical team involved in developing lesson plans for Kiswahili and English consisted of PRIMR reading experts in the United States and in Nairobi, SIL International reading experts, and other local language and education experts working via a subject panel. Members of the MoEST and KICD were invited to the writing workshops and attended as their availability permitted. The in-country team focused on using the scope and sequence of letters, words, and skills to develop corresponding decodable texts and teacher read-aloud stories, as well as writing instructional activities and teacher scripts to use as examples of the explicit language to use during instruction. The process involved regular consultations with KICD and with the PRIMR PDIT from October through December 2011.

The development process took approximately two months, November–December 2011. The final versions of these draft lesson plan documents were ready early in January 2012.

These were piloted in the Cohort I schools in 2012 and were submitted to USAID and the MoEST for review later the same year.

Lesson Plan Development – Mathematics

A technical team consisting of RTI international math experts and a PRIMR math expert worked closely with two other local math experts to develop and flesh out the scope and sequence for the three terms of mathematics instruction. The team drew on inputs from additional experts who were working on the USAID Liberia Teacher Training Program (LTTP2), as well as materials developers contracted to LTTP2, but used the Kenya scope and sequence to prepare materials for both LTTP2 and PRIMR. The materials continued to be vetted by the Kenyan math experts on a continual basis. Given the complexity of the Kiswahili and English teacher training that took place in January 2012, PRIMR began implementing the mathematics lesson plans later, in Term 2. This delay allowed the teachers to become acclimated to the PRIMR methods without being overwhelmed by content across the three subjects.

Pupil Book Development – Reading and Mathematics

As initial lesson plans were finalized, work began on the development of the pupil books. These books were designed to include each day's content on a single page, making it easier for teachers and students to follow as well as keeping costs low. The books followed KICD size, paper, and binding guidelines for book publishing. For English and Kiswahili, each page contained some combination of the letters, syllables, words, and stories that the teacher was to present on each individual day. For mathematics, each page presented activities in computation, number sense, operations, and word problems for each day. For all subjects, the page content and design were organized to maximize learning, and the materials were clearly integrated with the teacher lesson plans.

In addition, a local illustrator produced carefully designed hand drawings for each lesson plan. The illustrations connected to the subject matter of each story without telling the entire story; this arrangement would require students to read the text in order to understand the story, instead of relying solely on the illustration. Initially these books were produced in black-and-white with a color cover. Later, due to increased demand, full-color books were produced under the DFID Rural Expansion scope of work and utilized in all PRIMR-supported schools in 2014.

2.3 Instructional Materials Revisions

The PRIMR instructional materials were reviewed and revised each year of the Initiative. The reviews involved a three-step process of (1) looking at data from classroom observations and student assessments to understand where teachers and students were struggling, (2) having a group of PRIMR teachers review the materials and give feedback, and (3) soliciting a review of materials by the MoEST and appropriate SAGAs via a subject panel. Based on all the information gathered, PRIMR revised the instructional materials in time for the following school year. An additional set of reviews of the revised versions of instructional materials also took place in 2013 before implementation in 2014, due to significant changes in format for both the teachers' guides and pupils' books.

Overall, two main changes were made to lesson plans for all subjects. First, instructional activities were analyzed and simplified to include only the most essential and useful activities. Second, as noted earlier, in 2013 it became clear that teachers and coaches were struggling with the amount of text in the lesson plans due to the full scripting. It was decided by the technical team to cut back on the scripting in all subjects. The teachers' guides used in 2014 were fully scripted only for the first three weeks of lessons. The scripting then tapered until there were instructions only for activities and the letters or words to be used in each activity. **Exhibit 4** illustrates the differences.

Exhibit 4. Sample lesson plans from teachers' guides, 2012, 2013, and 2014

<table border="1"> <tr><td>Class:</td><td>Date:</td><td>Duration:</td><td>Roll:</td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </table>		Class:	Date:	Duration:	Roll:					<p align="center">English Reading LESSON PLAN Term 1 Week 2 Day 2</p> <table border="1"> <tr><td>Learner page:</td></tr> <tr><td>6</td></tr> </table>	Learner page:	6	<table border="1"> <tr><td>Class:</td><td>Date:</td><td>Duration:</td><td>Roll:</td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </table>		Class:	Date:	Duration:	Roll:					<p align="center">English Reading LESSON PLAN Term 1 Week 2 Day 2</p> <table border="1"> <tr><td>Learner page:</td></tr> <tr><td>7</td></tr> </table>	Learner page:	7
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<p>Oral Language – Classroom vocabulary This week we will learn about our school and classroom. We will learn things in the classroom and we will learn about actions we do in the classroom.</p> <table border="1"> <thead> <tr> <th>Verbs</th> <th>Adverbs</th> </tr> </thead> <tbody> <tr> <td>T: The first word is stand. What is the word? L: Stand T: Demonstrate stand and say I stand. Now you stand. L: Stand while saying the word repeat 3-5 times then teach next word – sit, turn</td> <td>T: The next three words are up, down and around. (Have learners repeat words one at a time) L: Say words T: Tip in toward the sky (point and look up) and Down is toward the floor (point and look down) The sky is up. The floor is down. (point while saying) What else is up? What else is down? (If learners don't understand the question skip and show them up and down with a book or pencil) (Call on 3-5 learners to share) T: I stand up. I sit down. Now you stand up. Now you sit down. (demonstrate while talking) repeat 3-5 times then teach next word T: The last word is around. What is the word? L: Around T: I can turn around. (demonstrate) Now you turn around. L: Turn around T: Now let's practice. (tell learners several lines to stand up, sit down, and turn around)</td> </tr> </tbody> </table> <p>Teacher Read Aloud – Vocabulary/Pre-reading Now we will listen to a story with our new words. Before we read we will talk about what the story might be about. When you hear any of our new words – stand, sit, turn, up, down, around – show thumbs up (demonstrate for learners) Story: I am Tamara. I am Mat. I am the teacher. We all stand up. We all sit down. Mat, stand up! Mat, turn around! Mat, sit down. Tam, stand up! Tam, turn around! Tam, sit down. Mat and Tam, stand up! Mat and Tam, turn around! Mat and Tam, sit down. We all stand up. We all turn around. We all sit down!</p> <p>Comprehension Now that we have read the story, we will practice answering questions to see if we understood what we read.</p> <table border="1"> <thead> <tr> <th>"I do"</th> <th>"We do"</th> <th>"You do"</th> </tr> </thead> <tbody> <tr> <td>Step 1: T: Let's look at the first question. Who is in this story? Model for learners how to look for the answers in the text as you say. I go back to the story and look for the answer. T: Find the answer and tell learners the answer.</td> <td>Step 2: T: Next question. What do Tamara and Mat do? Read the story again and ask learners what they characters are doing? If learners do not answer help them by explaining and giving answer. Have learners repeat the answer.</td> <td>Step 3: T: Did you enjoy the game? Why or why not? L: Give their opinion</td> </tr> </tbody> </table>		Verbs	Adverbs	T: The first word is stand . What is the word? L: Stand T: Demonstrate stand and say I stand. Now you stand. 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If most learners know the word, move on. If not demonstrate walking and say, This is walking. Now you walk. Repeat using: stop, hop, point T: Now let's practice the words. I say the word, you show me. Say one word at a time and show the word first do with learners. Give feedback as necessary.</td> </tr> </tbody> </table> <p>T: Now you try. Ask the person next to you to show the words: desk, blackboard, door, walk, stop, hop, point If the learners have gone quickly through all the words, follow the same pattern with the following words: Floor, Wall, Chair, Clip, Point</p> <p>Teacher Read Aloud – Vocabulary/Pre-reading Now we will listen to a story with our new words. Before we read we will talk about what the story might be about. When you hear any of our new words – desk, blackboard, door, walk, stop, hop, point – show thumbs up (demonstrate for learners) Story: Who can walk? I can walk. Who else can walk? The teacher can walk. Who else can walk? That cat can walk. Who else can walk? That dog can walk. Who else can walk? That hen can walk. Who else can walk? That baby can walk. Stop, baby! I can help you.</p> <p>Comprehension Now that we have read the story, we will practice answering questions to see if we understood what we read.</p> <table border="1"> <thead> <tr> <th>"I do"</th> <th>"We do"</th> <th>"You do"</th> </tr> </thead> <tbody> <tr> <td>Step 1: T: Let's look at the first question: Who is in this story? Model for learners how to look for the answers in the text as you say. I go back to the story and look for the answer. T: Find the answer and tell learners the answer.</td> <td>Step 2: T: Next question: What are they doing? Read the story again and ask learners what they characters are doing? If learners do not answer help them by explaining and giving answer. Have learners repeat the answer.</td> <td>Step 3: T: Why should the baby stop? L: Respond</td> </tr> </tbody> </table>		Nouns	Verbs	T: The first word is desk . L: desk T: Where is a desk? 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4a. Spread from 2012 teachers' guide, English, Class 1, Week 2

Lesson Plan: English Reading Week 1 Day 3

Theme:	Class:	Date:	Duration:	Roll:	Word Parts:	Learner page
Wild Animals					L, n, h, o	3-4

T: Open your book on p.3. Put your pencil/bookmarker there. Close the book.

Letter/Sound Knowledge
Now we will practise the names and sounds of the English letters we have learned.

"I do"

Step 1
Use flashcards. Point to the letter and say:
T: The name of the first letter is 'h'.
T: The sound is /h/.
T: Now I write the letter while I say the sound.
Write the letter on the board and say the sound.

"You do"

Step 2
T: Now you try. This letter is?
L: /h/.
T: The sound of this letter is?
L: /h/.
Repeat steps 1-2 with the following letters: 'i', 'o', 'w', 'a', 't'.
T: Open your exercise book. How I will say a sound and you will write the letter while you say the sound.
T: Say sound of each letter twice while pupils write.

Regular Word Reading
Now we are going to practise reading and writing words.

"I do"	"We do"	"You do"
<p>Step 1 Put the word 'hot' on the board/pocket chart. Put your finger under the first letter of a word and say: T: Watch me, /h/, /o/, /t/. T: Now remove the first letter of the word and say. How the word is: 'ot'. T: If I add the letter 'h' at the beginning now it says 'pot'.</p>	<p>Step 2 Put the word 'hot' on the board/pocket chart. T: Now we will do it together. Remember to say the sound of the letter as I point to it. T: Point to each letter of the word T & L: /h/, /o/, /t/. T: This word is... T & L: 'hot'. T: Remove the first letter of the word. Now it says... T & L: 'ot'. T: If I add the letter 'p' at the beginning it says... T & L: 'pot'.</p>	<p>Step 3 T: Now you try it. T: Put the word 'hot' on the board/pocket chart. Point to each letter as the pupils say: L: /h/, /o/, /t/. T: This word is... L: 'hot'. T: Remove the first letter of the word, say: T: Now this says... L: 'ot'. T: If I add the letter 'p' at the beginning it says... L: 'pot'. Repeat step 3 with 'not'.</p>
<p>Step 4 Put the word 'hot' on the board/pocket chart. Put your finger under the first letter of the word and say: T: Watch me, /h/, /o/, /t/. T: Now remove the letter 'o' I have the letters 'ht'. T: If I add the letter 'a' to the middle of the word it says 'hat'.</p>	<p>Step 5 Put the word 'hat' on the board/pocket chart. T: Now we will do it together. Remember to say the sound of the letter as I point to it. Then say the whole word. T & L: /h/, /a/, /t/. T: This word is... T & L: 'hat'. T: Remove the letter 'o'. We have the letters 'ht'. T & L: 'ht'. T: If I add the letter 'a' at the middle of the word it says... T & L: 'hat'.</p>	<p>Step 6 Put the word 'hat' on the board/pocket chart. T: Now you try it. T: Put the word 'hat' on the board/pocket chart. Point to each letter as the pupils say: L: /h/, /a/, /t/. T: This word is... L: 'hat'. T: Remove the letter 'o' of the word, say: T: This word is... L: 'ht'. T: If I add the letter 'a' in the middle of the word it says... T & L: 'hat'. Repeat step 3 with 'hat' and then with 'pot', 'pit', 'pet'. T: Now open your books on p. 3. Put your finger on the apple. Say the sounds of each word, then read the whole word to your partner.</p>

Wild Animals / English Reading / Week 1 Day 3 / 7

Word Knowledge
Now we are going to learn some new words that will help us read our story.

"I do"	"We do"
<p>Step 1 Put the word 'rips' on the board/pocket chart. Sweep your finger under the letters of the word and say: T: The word is 'rips'. Read 2 times slowly while sweeping finger under the word. T: How many of you know what the word 'rips' means? L: (Raise hands, if more than half of the pupils raise their hands, have pupils share with partner and ask at least 1 pair to tell the class. If not, continue saying the following. T: Pretend to rip a piece of paper. This is rip. You can rip a piece of paper. It means to break or tear.</p>	<p>Step 2 T: What is the word? T & L: rips. T: You can rip paper. What are other things that you can rip? T: Let 2-3 children answer. Repeat steps 1-2 with the following words: Hops (Hop around. Say, 'The teacher hops.' Your turn. The class hops.) Socks (Point to your socks. These are my socks. Your turn. Point to your sock.)</p>
<p>Step 3 T: Open your book on page 4. Let's look at the story we are going to read. The story is called Pat and the Bad Bird. T: We read for many reasons. T: We read for fun. We read for information. T: This is a story. It is not true. We read it for fun.</p>	<p>Step 4 T: This story is about a girl who meets a bad bird. Have you ever seen a bird? Have you ever seen a bird do something bad? T: Let 3-4 pupils answer. T: Put your finger on the title. Let's read the title together. T & L: Title. T: What can you see in the picture? Let 2-4 pupils answer. T: Close your books. Make a guess. Turn to your partner and tell them one thing you think will happen in the story.</p>

Time to Read
Now we will read our story.

"I do"	"We do"	"You do"
<p>Step 1 T: Open your books again. We are going to read to see if what you guessed came true in the story. T: First, I will read as you listen. Place your finger at the start of the first line and follow as I read.</p>	<p>Step 2 T: Now let us read together. T & L: Read story.</p>	<p>Step 3 T: Now it's your turn to read. L: Pupils read out loud while teacher monitors.</p>

Pupils' Story: Pat and the bad bird. Pat is at the zoo. She wants to see the bird too. It has very long legs. It has a long neck. The bird looks at Pat. Pat looks at the bird. Then the bird rips Pat's socks. Pat hops and runs. The bird is not fun.

Check your guess
T: Tell your partner whether your guess came true.
Call on 2-3 pairs to share their guess and whether it was true.

Wild Animals / English Reading / Week 1 Day 3 / 7

4b. Spread from 2013 teachers' guide, English, Class 2, Week 1

Week 13: Day 3

Week 13 Days 3 and 4 Weather word study

Read the letter sounds.
nk nd nt
nk nd nt

Thumbs Up/Down
Say sound. Say word. Pupils show thumbs up if word has the sound /nk/ at the end of the word.
/We do: /nk/, pink, pin
You do: /nd/ and /nt/ sand, sank, hand, sent, went, send.

Word Blending
Pocket Chart: Say each sound in the word. Blend the sound. Say the word.
/We do: /s/, /h/, /nd/, sand
You do: drink, wind, stand, went, spend
Pupil Book: Have pupils read words to their partner.

Vocabulary
Blackboard: Say the word. Ask pupils to define. If pupil's cannot define, show/demonstrate the word. Pupils use words in a sentence that explains the meaning of the word. Pupils find word in red from the story on page 64.
Words: windy, news, weather
Get Ready to Read
Oral: Read the title together.
Say: This reading is about Ann and the Weather.
What do you know about weather?
Tell your partner one thing you think will happen in this story.

Pupil Reading
Pupil Book: Teacher reads. Class reads. Partners read.
Say: Before your read, you told your partner one thing you thought would happen in this story. Did it happen?
Questions
I do: What does Ann want to know?
We do: What do you do with clothes when it is raining?
You do: What does Ann do to know the weather? When will Ann wash her clothes?
Writing Classwork
Pupil Book: Pupils write original sentences using words.
Classwork:
reads shine wash cold blow
1. The sun will _____.
2. It is _____.
3. The wind will _____.
4. She can _____ her clothes.
5. She _____ the news.
Writing Homework - (Homework Book 2 page 46)
Say: Every sentence starts with a capital letter. Write these sentences correctly starting each sentence with a capital letter.
1. she wants to know.
2. when can I wash my clothes
3. the weather is cold
4. today will be hot
5. there will be many cloudy

Date: _____ Duration: _____ Roll: _____

Week 13: Day 4

Week 13 Days 3 and 4 Weather word study

Read the letter sounds.
nk nd nt
nk nd nt

Oral Blending
Oral: Say the sounds of the word. Pupils say the word.
/We do: /h/, /n/, /d/, hand
You do: think, went, end, spend, drink

Word Blending
Pocket Chart: Write the words. Sweep finger under each letter while reading sound. Read once for each sound.
/We do: /s/, /l/, /nt/, sent
You do: think, land, sink, bank
Pupil Book: Have children read words to their partner.

Vocabulary
Blackboard: Say the word. Ask the meaning. Use the words in sentence. Pupils find the words in red in the story on page 64.
Words: news, windy, weather.

Pupil Reading
Pupil Book: Teacher reads story with pupils. Pupils read with partner.

Make a Table
Draw table to compare the weather from two different days from the story.

Today	Sunday

Writing Classwork
Write on the board:
There will be many clouds. It will be windy.
Read the sentences to the children. Tell the children to write two more sentences about weather.

Writing Homework - (Homework Book 2 page 48)
Pupils choose five words and write their own sentences
Pupil Book: slow, grow, sent, glow, tow, row, pink, land, flow, low

Teacher tip
Make sure you follow "I do," "we do," "you do" when teaching.

Date: _____ Duration: _____ Roll: _____

4c. Spread from 2014 teachers' guide, English, Class 2, Week 13

PRIMR Materials Revision and Improvement, 2012

PRIMR spent considerable time during the final calendar quarter of 2012 developing, reviewing, and revising the second edition of the instructional materials for use by teachers and pupils in 2013. The PRIMR technical team focused on improving the Class 1 materials (based on feedback from 2012) and writing the Class 2 materials. The group consisted of PRIMR staff, international consultants in languages and math, TAC Tutors, coaches, and teachers from both the formal and LCPS sectors. This technical team worked continuously throughout October–December 2012.

A workshop was organized in Nakuru in the first half of December to review and critique the revised materials, with the aim of improving their quality, relevance, and appropriateness in line with KICD guidelines. The other objective of the workshop was to discuss the philosophical underpinnings of materials development and review, and to share and appreciate the impact of the PRIMR intervention in the year 2012.

The workshop brought together relevant stakeholders, including the PDIT members, a staff member from CEMASTEAM, PRIMR staff, and USAID representatives. In all, 32 (15 male and 17 female) participants were in attendance. The MoEST was represented by Madam Margaret Murage, who gave the keynote address. In her remarks, she underscored the importance of the PRIMR Initiative as one of the MoEST processes for addressing gaps in the quality of education in Kenya, since PRIMR focused on improving student outcomes in reading and mathematics in the early grades. She confirmed that the Ministry claimed ownership of the materials and looked forward to scaling up the program once the implications were fully discussed and agreed upon.

Dr. Teresiah Gathenya, USAID Contracting Officer's Representative for PRIMR; and Dr. Christine Pagen, Deputy Director, Education & Youth, USAID/Kenya, also attended the two-day workshop. Dr. Gathenya acknowledged the PRIMR technical and revision teams for their dedication, noting that equipping a child with reading and math skills opens the whole world to that child. She urged the participants to keep up their dedication, in order to reach greater heights, including the 2015 answers to the Millennium Development Goals and Education for All goals that require addressing education quality. She explained that the USAID Education Strategy focuses on early grade reading, with Goal 1 targeting 100 million children across the world being able to read with better fluency. Dr. Pagen echoed Dr. Gathenya's observations and promised to support the team to achieve more in the next year. The technical team put in a great deal of effort during the workshop. In addition to editing the material, the group suggested changes to the content to better suit the age group with which PRIMR was working. In Kiswahili and English, the group suggested simplifying the language and made corresponding changes to some of the stories. A detailed report on the attendees' decisions and changes was compiled and shared with the members. After the workshop, a small team of the technical staff continued making corrections and improving the materials as suggested during the workshop. Most of this work was done in the second half of December 2012 at RTI's offices in Nairobi.

On December 5, 2012, a subgroup of the PRIMR technical team held a meeting to discuss the revisions done following the Nakuru workshop. This was necessary to further harmonize the changes that had been suggested and to ensure that all issues were taken

care of. The design team worked tirelessly to ensure that schools would have materials in early 2013, as the school year and teacher training began.

PRIMR Materials Revision and Improvement, 2013

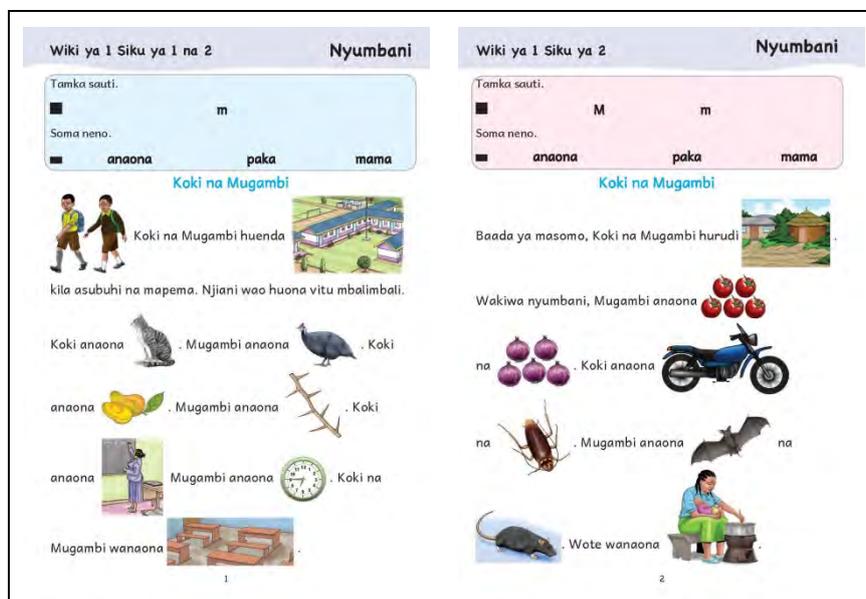
The last set of materials revisions was undertaken in September–December 2013. During this quarter, the PRIMR team continued improving the learner books and teachers’ guides for English, Kiswahili, and math, and finalizing the DFID-funded mother-tongue pupil textbooks and teachers’ guides for Kikamba and Lubukusu. At the beginning of the materials revision process, during an extensive and intense workshop, the PRIMR team and skilled consultants updated the materials based on the KICD syllabus. This was followed by a three-stage review process.

The first level of review involved technical expertise from teams that had been implementing PRIMR using the materials in the PRIMR schools. These were specifically selected Class 1 and 2 teachers as well as TAC Tutors and coaches. The review of materials took place over two days in the first week of November 2013 at RTI’s offices. The comments from teachers, TAC Tutors, and coaches were incorporated for the improvement of the materials. Reviewers were impressed with the new design and full color of the new materials for the 2014 school year, predicting that pupils would find them stimulating.

The second level of review involved participants from the MoEST and the SAGAs who were subject specialists. This subject panel met at workshops in Nakuru in November 2013 and in December at RTI’s Nairobi offices, and included subject panelists led by Quality Assurance and Standards officers from the MoEST and panelists from the SAGAs, TAC Tutors, coaches and teachers.

The specific tasks for this review of the materials were to read and revise every word in the pupil books and teachers’ guides for consistency and quality. The teams worked diligently and completed the review and the revision on time (see **Exhibit 5** for a sample).

Exhibit 5. Sample spread from 2014 pupil book for Kiswahili, Class 1



The third level of review gave the MoEST senior management team an opportunity to examine the pupil books and teachers' guides. Director of Basic Education Mrs. Leah Rotich said that she found the books very exciting for the pupils in lower primary school and that RTI should proceed to produce copies for distribution in schools.

2.4 Instructional Materials Distribution

PRIMR's achievements in improving pupils' reading and numeracy were partly attributable to the provision of instructional materials to schools, many of which had not received appropriate (or any) materials before the implementation of PRIMR. Immediately after the finalization of the development of lesson plans, learner books, and classroom materials in February 2012, Kiswahili and English materials were supplied to the PRIMR schools at a 1:1 ratio for every child enrolled in Classes 1 and 2. They were distributed according to an agreement with KICD regarding the use of the materials for research purposes only (and with a stamp on each book to that effect). During the second and third follow-up training sessions for teachers and head teachers, they received in-depth training on the use of the learner books.

Each Class 1 and 2 teacher and head teacher received three lesson plan books (Kiswahili, English, and math) initially, with further volumes being distributed later in the year. In addition, the teachers received a pocket chart and laminated letter cards, 2 assessment manuals (1 combined English/Kiswahili and 1 math), a laminated number grid, number cards with number operation signs, and a set of rulers. Each pupil received a learner book for the three PRIMR subjects as per the enrollment information provided by the schools. Each class received 21 titles of supplementary readers and a basket for holding the readers. A school report card template was issued to each school. A guideline on the handling and usage of the PRIMR materials was also drafted by the technical team and shared with the schools during the delivery of the learner books. This was meant to safeguard the books and materials issued.



Training in use of a pocket chart.

As noted earlier, these instructional materials were revised every year. And given that more schools joined the Initiative each year, more of the revised materials were produced and distributed to schools, always ensuring a 1:1 ratio of books to pupils. Because of the popularity of the program, schools under PRIMR witnessed increased enrollment, which necessitated distribution of more materials.

During the second year, apart from learner books for English, Kiswahili, and math and their accompanying lesson plans for Classes 1 and 2, PRIMR developed and distributed other materials that enhanced teaching and learning. These included a teacher tip sheet that highlighted the teaching of specific components of reading and mathematics; and supplementary readers and classroom libraries, to bolster the number of books to which pupils were exposed, with the particular objective of improving their vocabulary. The

package to schools also included an assessment kit: assessor manual, student stimulus sheets, stopwatch, stopwatch batteries, and a report card template that could be used to report on pupils' progress. The pocket chart and letter cards were also included, to help in teaching of both phonemic and alphabetic principles of reading. Lastly, the materials distributed to schools included a blank student tracker and a read-at-home tracker, which were designed to monitor pupils' reading progress both at school and at home, and to involve parents in supervising children's homework.

The second year of PRIMR Initiative implementation also encompassed the schools participating in the ICT intervention in Kisumu County (see Section 4 below). For these schools, only the English and Kiswahili programs were implemented. In addition to distributing printed materials to these schools, PRIMR also issued ICT materials: 25 Nexus tablets used by TAC



Pupil writing in the activity book for math

Tutors in the TAC Tutor tablet group and by teachers in the teacher tablet group, and 974 e-readers for the pupil e-reader intervention group.

In the last year of the implementation of PRIMR Initiative, the number of schools receiving PRIMR materials had risen from 125 to 547 schools in the five counties: Nairobi, Kisumu, Nakuru, Kiambu, and Murang'a. Total enrollment in these schools reached 56,036 pupils. Each of these pupils received a learner book for English and Kiswahili. However, those receiving math books were slightly less in number, given that the math intervention was not implemented in Kisumu. **Exhibit 6** shows the number of books ordered and distributed to USAID PRIMR schools in January 2014.

Exhibit 6. PRIMR books and teachers' guides distributed in January 2014

Subject	Class	Pupil books	Teachers' guides
English	Class 1	27,858	717
	Class 2	28,184	725
Kiswahili	Class 1	27,858	717
	Class 2	28,184	725
Math	Class 1	20,839	540
	Class 2	21,402	540

3. Teacher Pedagogical Support in Reading and Mathematics

One of the objectives of the PRIMR Initiative was to strengthen teacher pedagogical support in reading and mathematics. The PRIMR approach asked teachers to change their instruction

significantly based on a model developed by Guskey (2002)¹² suggesting that teachers require a combination of professional development and ongoing support that gives them an opportunity to implement the new instruction. When teachers see the positive impact on their students, they will choose to change their attitudes and beliefs over the long term.

In order to accomplish this change management, PRIMR set up a model that included professional development and in-class teacher support for teachers to implement the lesson plans developed by PRIMR. TAC Tutors provided both approaches in formal schools, and PRIMR hired instructional coaches to do the same for the LCPSs. The TAC Tutors and instructional coaches also required similar professional development and ongoing support from PRIMR reading experts and technical staff in order to train and support teachers effectively.



Training in math instruction

Regarding training, PRIMR used the existing cascade model employed by the MoEST. Given that TAC Tutors are mandated to support teachers, it was essential that RTI first train TAC Tutors who would, in turn, train teachers. These structures, however, existed only for formal schools. RTI had therefore to replicate a similar structure for the LCPSs. This was made possible through the partnering with CfBT, which recruited instructional coaches to serve the same function as the TAC Tutors for the already constructed LCPS clusters. Recall that PRIMR constructed clusters composed of 10–15 schools each. Each instructional coach was in charge of one cluster. Training for TAC Tutors, coaches, and teachers was held whenever materials were revised and also whenever new individuals joined the program, as well as refresher training during term breaks in the school year. The following sections cover various TAC Tutor, coach, and teacher sessions held during the PRIMR implementation phase.

3.1 Training of TAC Tutors, Coaches, and Teachers

Each year, the TAC Tutors and instructional coaches participating in the PRIMR Initiative received three trainings (see summary in **Exhibit 7**). Trainings were scheduled during term breaks so as not to interfere with TAC Tutors' and instructional coaches' ability to observe in classrooms and support teachers. These trainings were facilitated by a combination of RTI reading experts, local consultants, a curriculum development expert, and PRIMR technical staff. The workshops had two purposes: (1) to teach TAC Tutors and instructional coaches how to implement the PRIMR lessons, and (2) to teach them their role in training and supporting the teachers.

¹² Guskey, T.R. (2002). Professional development and teacher change. *Teachers and Teaching: Theory and Practice*, 8(3/4), 381–391.

Exhibit 7. Summary of TAC Tutor and coach training, 2012–2014, by county

County	Trainees	Number of trainees, by year		
		2012	2013	2014
Nairobi, Nakuru, and Kaimbu	TAC Tutors and coaches	46	66	35
	Teachers	942	3,237	2,529
Kisumu	TAC Tutors	n/a	6	815
	Teachers	n/a	395	832

* Many teachers and TAC Tutors/coaches attended more than one PRIMR training. The figures in the exhibit indicate the total number of participants at each training, which means there is some double-counting of individual trainees.

During each session, the TAC Tutors and instructional coaches received the exact training they were to give to the teachers, as well as training on how to support teachers in classrooms and how to deal with challenges that come up with teachers. These trainings gave the participants just enough information and explanation of the theoretical aspects to allow teachers to be able to implement the instructional activities well. However, the main activity of these trainings was practice applying the techniques and using the materials in small and whole groups, and receiving feedback from peers and facilitators. The format for training followed the same direct-instruction approach (model, guided practice, independent practice/assessment) that was used in the lesson plans. Facilitators explained the skill, then modeled the activity(s) to teach the skill. Participants would practice in small groups with support of facilitators, followed by time for participants to model teaching the skill for a small group or in front the whole group and receive feedback from facilitators and peers.

Initial Training

The initial session consisted of a five-day training on implementing and using the PRIMR instructional materials in the classroom, followed by training on the role the Tutors and coaches would play in supporting teachers.

The instructional training concentrated on teaching coaches and Tutors the PRIMR direct-instruction approach (which came to be known as “I do / We do / You do”) and what that looks like in each subject. Participants were given specific instruction on what the materials were, what they contained, how they were all connected, and how to use them. The English and Kiswahili training programs were combined into training on the foundations of reading theory, the five components of reading (see page 12), and ways to implement the specific instructional activities for each component of reading. The math instructional program also required a five-day training, focusing on what foundational skills students need to master, how to teach them, and how the lessons were different from and similar to the English and Kiswahili lessons. This was the main training on how to implement the instructional programs; however, it centered only on the instructional activities and content for Term I of the school year, to minimize the amount of information being given.

Note that in 2012, due to the staggered implementation approach, the initial math training was conducted July 2–4.

Refresher Training

Term 2 and Term 3 refresher trainings were conducted during the term breaks—in April/May and August/September. These trainings ranged from 2 to 4 days during 2012, 2013, and 2014. This training reviewed the direct-instruction approach, the five components of reading, and the associated instructional activities, with a



Head teacher training

focus on vocabulary and comprehension, as these were shown to be the most difficult for teachers. The math refresher training concentrated on the difference between math concepts and strategies used to teach them. Three concepts and their strategies were practiced. The activities modeled and practiced were drawn from Term 2 lesson plans.

Participants also spent time during these trainings discussing their success and challenges with implementing instruction, allowing for reflection and peer-to-peer discussions on possible solutions to problems that were occurring. These trainings were also an opportunity to train any new teachers who had begun teaching in a PRIMR school after the initial training. Facilitators worked closely with new teachers, pairing them with established PRIMR teachers to support the new teachers in catching up efficiently.

Training Specific to TAC Tutors and Instructional Coaches

Tutors and Coaches also received training aimed at teaching them skills to support teachers and practice lesson implementation. Participants learned what it meant to support and mentor teachers instead of evaluate them. They practiced observing teachers and giving feedback in small groups and the whole group, allowing participants to receive feedback as they practiced. Tutors and coaches also learned how to assess students' oral reading fluency and comprehension (with other adult participants standing in as "students") as well as how to fill in the classroom observation form with appropriate feedback that would support the teachers and the project. During refresher trainings, the TAC Tutors and coaches reviewed these skills specific to their role, paid specific attention to any issues seen by the PRIMR staff, and had time to discuss and address their own challenges with supporting teachers.

3.2 Classroom Observations and Coaching

PRIMR spent most of the project time on supervision and support of teachers. TAC Tutors and coaches were asked to visit all of their teachers at least two times per month. Each visit consisted of a lesson observation of at least one of the three subjects; a teacher observation form, filled out with detailed information about what the teacher did well and what areas for improvement existed in each component of the lesson; and finally, a conversation between Tutor/coach and teacher to review the observation form and give support where needed. The Tutor/coach would also meet with the head teacher of each school to discuss the classroom teachers' progress and any support head teachers could give to their teachers.

Just as with the training, supervision was undertaken at two levels. The first one entailed the PRIMR technical team supervising and supporting TAC Tutors and coaches. This was aimed

at helping them as they gave feedback to the teachers. The efforts in supervising instruction bore results in improving instruction in general and learning outcomes in particular. Teachers appreciated the support they got from the TAC Tutors/coaches and the technical team members.

The second level of supervision involved TAC Tutors and coaches supporting teachers in improving teachers' pedagogical skills. During lesson observation, the TAC Tutor or coach interacted with the teacher on the quality of the lesson and gave appropriate feedback on various aspects of the lesson, which included the use of lesson plans and pupils books. This process focused on giving the teachers ongoing encouragement and constructive advice to help them to change their practices in the classroom.



Feedback session

PRIMR's theory of change posited that teachers are adult learners requiring sophisticated learning mechanisms, and that the Tutor/coach-to-teacher relationship, focused on instruction, was necessary for teachers to conceptualize how to change behavior in the classroom. During February 2012, all teachers in all zones were observed at least once, with nearly all teachers in the LCPSs observed twice. Each visit was punctuated by a discussion around the lesson feedback form, during which the Tutor/coach and the teacher would look at the feedback given by the Tutor/coach and discuss what impact it could have the next time the teacher presented a lesson. The PRIMR team theorized that the innovation most likely to have significant impacts on student outcomes would be ongoing feedback to teachers.

This process also helped teachers to perform self-evaluations and work on improving lesson delivery and quality on a daily basis. Unfortunately, however, the findings from the September 2012 lesson observations indicated that the teachers were not observed as frequently in the formal schools as in the LCPSs, owing to a teachers' strike that began in June 2012 and the support TAC Tutors were required to give to national examinations.

During the second and third years of implementation, it was required that each TAC Tutor or coach observe each teacher monthly. Given that the TAC Tutors' and coaches' support to teachers was a key strategy of the PRIMR Initiative, efforts were made to keep supporting teachers in the intervention schools, which had now increased from 125 to 547. This was sometimes difficult in the formal schools in particular, because of distances between schools and the number of Class 1 and 2 teachers for which each TAC Tutor was responsible. Despite these challenges, the TAC Tutors and coaches continued to provide essential in-class support and feedback.

Many TAC Tutors were limited to a single visit to observe their teachers given their busy schedules. In 2013, one reason was that the first term was shortened because of the

national elections. Pupils in formal schools were given a whole week off (March 4–8) because the schools were used as voting centers. PRIMR also held scheduled teacher trainings during the month of January that limited the time available for TAC Tutors and coaches to visit schools.

A second reason was the effect of a second nationwide government teachers' strike in Kenya that began in August 2013. Teaching in public schools was again suspended during this time; thus, TAC Tutors were not able to visit teachers in those classrooms. However, coaches' visits to LCPSs continued as planned since the private schools' sessions were not affected.

The third reason was TAC Tutors' obligations to the TSC to collect data, perform other inspector-type duties, and attend meetings. While the job of the TAC Tutor in Kenya is to provide instructional support to teachers, often they are called upon to do the job of an inspector as well. Also TAC Tutors often have 20 or 30 schools in their jurisdiction and are physically unable to reach all Class 1 and 2 teachers in all schools more than once per month. Further, according to their job description, they are charged with supporting all Class 1–8 teachers in all of these schools. This could mean having to support 400+ teachers. Thus, TAC Tutors with these supervisory ratios were not able to provide the same level of support to schools as instructional coaches with 10 or 15 schools.

3.3 Monthly Reflection Meetings for TAC Tutors and Coaches

Monthly reflection meetings were a forum for TAC Tutors and coaches to share best practices, with the objective of communicating feedback and lessons learned, and thereby further improving teaching and learning. These were scheduled monthly in the participating counties. They were held upon completion of separate meetings in the respective clusters and zones. These meetings also provided a chance to check inventory on instructional materials that had been delivered to the schools, and to address any shortfalls.

3.4 Monthly Cluster Meetings for Teachers

Another channel through which PRIMR improved reading and math outcomes in schools was monthly meetings in all zones and clusters. These meetings gave the teachers and head teachers an opportunity to share their experiences in implementing PRIMR, such that the meetings became a tool for ongoing professional development. TAC Tutors and coaches used these sessions to address common issues arising from lesson observations and to improve on the instruction skills of the teachers. To do this, the TAC Tutors and coaches modeled specific lesson activities; or sometimes the Tutor/coach asked a teacher to model a lesson activity, for learning purposes. The TAC Tutors and coaches also emphasized the need for teachers to prepare for the reading and math lessons and to identify the required teaching aids beforehand. Some of the feedback from the teachers implementing PRIMR included:

- Learners have improved their comprehension strategies; they now find prediction easier and are developing the ability to get answers from the text.
- Teachers appreciate the lesson plans, saying the instructions are practical and systematic.

- PRIMR has given the pupils an opportunity to practice reading, although there is a need to allocate time for reading in the timetable.
- Class 1 pupils are developing confidence in reading and can construct simple sentences.
- Involving the head teachers in trainings resulted in the Class 1 and 2 teachers expressing that they were seeing improved levels of support and interest from the school heads.

With time, reports from these cluster meetings revealed that the various PRIMR interventions had led to improved teaching standards and learners' mastery of content. The teachers were becoming more and more confident in teaching different concepts. Feedback from these cluster reflections was reviewed regularly and used to monitor project uptake, as well as serving as input for continuous improvement for better outcomes.

3.5 Use of ICT to Support Teachers

Implementation of SMS Support Service

PRIMR's SMS support service was born of a need to provide real-time support to teachers in using the PRIMR model. SMS messages (see text box for examples) targeted teachers, head teachers, coaches, and TAC Tutors. During the first calendar quarter of 2012, PRIMR purchased a laptop dedicated to an SMS support service. Using Frontline SMS, a free software that can manage distribution to large groups; and low per-SMS prices via Safaricom, the project team created a program to provide continual pedagogical SMS feedback to teachers throughout the life of PRIMR. Starting in March 2012, all PRIMR teachers and head teachers received a focused SMS at regular intervals. Teachers were encouraged to respond to the program with questions and concerns. During the second quarter of 2012, PRIMR sent out its first SMSs to PRIMR teachers, encouraging them in their work.

As mentioned, the SMSs were intended to improve pedagogy in schools, but with time, the technique also became a management tool. Through this system, the teachers, coaches and TAC tutors were informed about activities planned in their zones/clusters, and the scheduling of meetings. This system was found to be efficient in delivering required information to the target groups. This service was used until the end of PRIMR in 2014. By the last months of implementation, the service had reached an optimum of two SMSs per teacher and one SMS per head teacher, both on a weekly basis.

Examples of PRIMR encouragement and reminders via SMS

To teachers:

1. Make sure you use the ' I do, We do and You do' on each activity to help your learners be successful with the new skills.
2. Remember to give formative feedback to learners by explaining what they have done right and what they have done wrong and how to do it correctly.
3. Explain vocabulary words using a picture, gestures or simple familiar words.
4. Make sure you give homework to learners so that they get a chance to practice what they learned.

To TAC Tutors and coaches:

1. Give teachers at least 1 positive comment to start and no more than 3 areas for improvement for each visit.
2. If you see a teacher who is excellent in one component of reading or maths, have them model for other teachers at your next zonal meeting.
3. Be sure to randomly pick 3 learners to read or do maths with you before you leave the classroom after lesson observation.
4. Ask teachers to reflect on how they think their lesson went before giving your own feedback.
5. Ask our PRIMR education officer for suggestions for topics for your monthly meeting.

Tablets as Tools for Teacher Support, 2014

During the last year of PRIMR Initiative implementation, TAC Tutor and coach support as well as teacher support moved to the use of digital tools on Nexus 7 Tablets. With funding from the DFID National Tablets Programme, the PRIMR Initiative converted the paper-based classroom observation form to a digital version on the Tangerine^{®13} platform. The tablets became a tool that allowed TAC Tutors and coaches to carry all instructional materials, videos, and observation tools in one small device. This was informed by the ICT intervention in Kisumu County (see Section 4), whose results had shown that the TAC Tutor tablet was the most effective and cost-effective method of engendering ICT in teaching and learning. Use of tablets in observations made the process more efficient and quite reliable, and by end of April 2014, the PRIMR technical team had made 505 support visits to work with TAC Tutors and coaches. The TAC Tutors and coaches themselves had made a total of over 2,400 observation visits to schools within Nairobi, Kisumu, Nakuru, Kiambu and Murang'a counties, logging and uploading their results via the tablets. (The National Tablets Programme is explained in further detail in Section 7.2.)

3.6 Periodic Student Assessments and Test Development

Continuous Assessment

Undertaking periodic or continuous assessment is a vital aspect of teaching and learning. Well-conducted formative assessments can help teachers to group pupils according to ability, evaluate pupils' understanding of the lesson content, and make correct decisions on whether to progress with lesson coverage or repeat a lesson covered previously. In contrast, poor learner assessment can lead to misinformed decisions about classroom promotion, failure to highlight and remediate learners' weakness, and poor ranking of pupils, among other areas.

The PRIMR team discovered—largely as a result of community reading and math exhibitions (see Section 3.7)—that as a whole, teachers had limited capacity to develop and apply appropriate assessments. In response, PRIMR intervened through training and support specifically to help teachers develop assessments (see below).

All TAC Tutor, coach, and teacher trainings had components on undertaking assessments. The sessions emphasized unbiased assessments that would provide precise and accurate findings on learner abilities. Students were assessed on letter sounds, reading passages, and basic mathematics assessments on the content that had been covered.

End-of-Term Assessments

During the second and the third years of PRIMR implementation, the PRIMR technical team identified the “examination culture” as influencing parallel teaching in the formal and LCPS PRIMR intervention schools. That is, some teachers and head teachers were convinced that

¹³ Tangerine[®] is open-source data collection software developed by RTI and customized for the EGRA and EGMA. Tangerine:Class[™] is a related program intended for teachers' use for continuous assessment in the classroom; Tangerine:Tutor[™] was created for use by TAC Tutors in the ICT study in Kisumu County. All are available from www.tangerinecentral.org.

solely using the PRIMR materials would negatively affect students' performance on the KNEC end-of-term examinations.

Because teaching to the exam drove many instructional decisions in classrooms, PRIMR developed a two-pronged response. First, PRIMR engaged the TAC Tutors and coaches to guide the schools in their zones and clusters on how to assess pupil mastery of reading skills and key math ideas as outlined in the PRIMR lesson plans. The technical teams then created model examinations, each covering a certain number of lessons in a term, for distribution to the respective zones. All zones prepared their own midterm and end-of-term examinations using the PRIMR models. Later, teachers were allowed to give their own examinations on content that matched the instructional methods used in PRIMR.

Second, given that these zonally set exams were not frequently used, the PRIMR team contributed to the development of end-of-term examinations that would specifically examine whether pupils had acquired the skills outlined in the KICD syllabus and reflected in the PRIMR lesson plans and books. In undertaking this task, PRIMR team members agreed to work jointly with District and Regional Education Offices, teachers, and head teachers to develop the examinations. These exams supplanted the examinations typically used at the end of school terms and instead reflected exactly what the children in PRIMR-supported public and LCPS schools were to have been taught that term, as well as building on knowledge from previous terms.

3.7 Assessment by Communities: Reading and Math Exhibitions

Reading and math contests—a critical component of PRIMR—had two key purposes. One was to create a forum and motivation for developing and administering tests to measure pupil progress, and to encourage the teachers and pupils that their hard work was paying off. The other was to focus on the community—that is, to support the creation and expansion of a reading culture in the target schools, to involve the local community in the creation and expansion of a reading culture, and to engage the local community leadership to be part of PRIMR.



Public announcement of a reading and math exhibition

During these events, children could showcase their skills in reading and math. It should be emphasized that these contests were not meant to be overly competitive, but instead provided a fun way to evaluate pupils' progress in reading and mathematics without losing focus on the bigger picture of "improved reading and math outcomes." The contests brought together children and their parents, teachers, head teachers, central government officials, county government representatives, business people, and church leaders, among other stakeholders.

Exhibitions were held once per term. Each school was invited to bring its best readers in both Classes 1 and 2, who would then compete at the zonal and cluster level. Some clusters

and zones first held semifinals for a handful of schools, in order to make the finals more easily manageable.

Gifts (in various forms, including books, pencils and other prizes) were awarded to the best learners, while most participants were appreciated with certificates. The exhibitions helped to raise the PRIMR Initiative's profile across schools and within the community among leaders and parents.

During Year 1 and the first part of Year 2, the PRIMR team prepared the test materials for the exhibitions on the teachers' behalf.

However, after that point, teachers were allowed to develop and manage these exercises with modest support from PRIMR technical staff. PRIMR was confident that the schools (head teachers and teachers alike) had the capacity and the interest to manage the exhibitions.

Organization and management of the reading and math exhibitions did present some challenges. These included the logistical challenges of organizing the exhibition in one school within each zone, and teachers' struggles to prepare test items. However, the exhibitions' exposure of teachers' limited knowledge of test development was very enlightening, since this was something that teachers needed professional development on in general.



Madaraka Zone: Class 2 students working out a math sum during a reading and math exhibition

4. Kisumu ICT Study

4.1 Study Design

The Kisumu ICT randomized controlled trial within PRIMR was designed to answer questions concerning the effectiveness of the use of technology in improving student outcomes. The study took place in formal schools in Kisumu County, during the 2013 school year, and consisted of 136 total schools, in three treatment groups and one control group. The main purposes of the study were to test the additional impact of three different ICT interventions on student outcomes and to understand which ICT intervention would be most cost effective for the impact on students. All participating treatment schools received PRIMR materials, training, and support. Treatment schools, however, also received one of three ICT interventions:

1. TAC Tutor tablet treatment – TAC Tutors received tablets with all the software teachers received, plus digital classroom observation tools built in Tangerine.
2. Teacher tablet treatment – teachers received tablets loaded with various instructional software, including the PRIMR teachers' guides and pupil books, Tangerine:Class to collect EGRA-like data to assess student progress, multimedia lesson plans with audio files of letter sounds and words, and a letter-sound recognition software developed by RTI called Papaya™.

3. Student e-reader treatment – students received e-readers loaded with the PRIMR English and Kiswahili books in electronic form, as well as hundreds of supplementary reading materials in English, Kiswahili, and Dholuo, a common language in Kisumu County. These materials gave pupils more opportunities to practice reading in and out of school.



Using an e-reader outside of school

4.2 Sampling

Sampling was undertaken in three steps. It first involved the selection of zones eligible for participation, which was determined to be the entire county of Kisumu.

These zones were then randomly assigned to treatment groups, stratified by peri-urban or rural location. The second stage of sampling entailed a random selection of 10 schools from each of the eight zones, giving a total of 80 schools across the eight zones. The third stage of sampling was at the pupil level, where PRIMR used simple random sampling stratified by gender for the baseline and endline assessments.

Ragumo and Bolo were assigned to the TAC Tutor tablet group, Barkorwa and Nyabondo zone were assigned to the teacher tablet treatment group, and Kodingo and Otonglo were assigned to the e-reader group. Chulaimbo and Ahero served as control zones for 2013, and in 2014 after the endline assessment, received the most cost-effective intervention.

Exhibit 8 shows the zones and treatment groups.

Exhibit 8. Type of ICT treatment, by zone

Treatment	Type of zone	
	Peri-urban	Rural
Tablets for TAC Tutors	Ragumo	Bolo
Tablets for teachers	Barkorwa	Nyabondo
e-readers	Otonglo	Kodingo
Control	Ahero	Chulaimbo

This randomized selection and assignment formed the basis of the PRIMR Kisumu ICT intervention as well as for the baseline and endline assessments of the ICT intervention.

4.3 Digital Instructional Tools

An RTI expert on ICT in education worked closely with the PRIMR initiative to develop several digital tools to be included in the ICT interventions. The purpose of the tools was to make implementing instruction and supporting teachers simpler and more efficient, leading to better instruction and better student outcomes.

- **Digital instructional materials** – All teaching and learning materials were loaded onto both the teacher and TAC Tutor tablets in PDF format, decreasing the need to carry or keep track of several large books.

- **Multimedia lesson plans** – A second set of lesson plans included audio files for letter sounds, words, and stories, which would help TAC Tutors and teachers ensure that students, teachers, and TAC Tutors heard and used correct pronunciation.
- **Model videos** – These videos showed PRIMR staff teaching essential activities for all three subjects. They were produced and uploaded onto both teacher and TAC Tutor tablets as an example of what good instruction should look like.
- **Papaya** – Teachers and TAC Tutors received this application on their tablets to support their own and their students’ learning and practicing of correct pronunciation of letter sounds in English and Kiswahili. The application included adult male, adult female, and student recordings of each phoneme. It also had an option for tablet users to record themselves and play back to assess their own pronunciation. The tool was used during training and in the classroom and was one of the most popular and widely used of the digital tools.
- **Tangerine:Class™** – Tangerine:Class was a digital assessment tool that allowed teachers to assess students individually using EGRA-like measures. At the end of each assessment, teachers were given suggestions for what to work on with students in order to help them make decisions about instruction. This continuous assessment tool was a key part of the teacher tablet intervention.

Most of these tools continued in use as part of the DFID-funded National Tablets Programme (see Section 7.2).

4.4 ICT-Specific Training

The ICT intervention study required separate training focused on the use of the technology within the PRIMR Initiative. Throughout the year, trainings in Kisumu followed the same schedule as the trainings in Nairobi for the other PRIMR treatment cohorts. The trainings also had similar content, except that the Kisumu training also dealt with ICT and its use in the three different treatment groups.

Initial Training, January 2013

The initial training for Kisumu focused on the ICT component of the PRIMR Initiative.

PRIMR invited TAC Tutors, DQASOs, and ICT Officers in Kisumu to a three-day meeting focusing on teaching the PRIMR lesson plans using the Nexus tablets and e-readers issued according to the respective zones’ intervention (see Exhibit 8 above). The ICT training was undertaken in two phases: the first on the PRIMR methodology and techniques, and the second on implementing PRIMR using the various ICT interventions.

The training for the core PRIMR design and program was identical for the three treatment groups. What differed was the ICT tool that was applied in each treatment group, and the level to which that ICT tool was applied. The training was integrated between technical and ICT trainings, with the focus on the implementation of the PRIMR program using ICT interventions as a tool to support instruction. As with all of PRIMR’s other training of coaches and TAC Tutors, the overall aim was to build the capacity of TAC Tutors to support teachers in delivering effective literacy instruction.



Lead trainer Carmen Strigel conducting a session during a four-day ICT training at PRIMR's office in Kisumu. In attendance were the TAC Tutors, District Quality Assurance and Standards Officers (DQASOs), and municipal and district ICT Officers.

Besides the six TAC Tutors (from each of the six treatment zones) who attended the first phase of training, four DQASOs—from Kisumu West District, Kisumu Municipality, Nyando District, and Nyakach District—attended the second training in Kisumu. This training focused on building capacity for effective delivery of PRIMR using the various ICT tools. Training also covered aspects of operation, troubleshooting, and maintenance of the physical ICT hardware.

Refresher Trainings, April and August 2013

Refresher training for those TAC Tutors involved in the ICT study in Kisumu took place in late April–early May 2013. The four-day refresher training was held at RTI's offices in Kisumu, again with one TAC Tutor from each of the six treatment zones. Similar to the Nairobi refresher training, the ICT refresher training focused on improving the knowledge and understanding of the five components of reading, with specific review and practice of activities with which teachers were struggling, as well as reflection on challenges and solutions that the TAC Tutors found very helpful.

The three ICT treatment groups had specific refresher training on the use of ICT in their particular treatment group. The “ICT for TAC Tutors” group reviewed and practiced using electronic tablets loaded with lesson plans and the Tangerine:Class software to assess students. The “ICT for teachers” group reviewed how to support teachers’ use of the multimedia lesson plans, the Papaya software application for producing letter sounds and pronouncing words, and the Tangerine:Class application for assessing and making instructional decisions based on students’ reading skills improvement. The third group, which used pupil-assigned e-readers, also reviewed how to use and track the students’ use of the supplemental reading materials.

Three times per year, the Kisumu teachers received the same training that the PRIMR technical team had given to their TAC Tutors. These trainings were facilitated by the TAC Tutors with support from PRIMR staff.

PRIMR Teacher Training, February 2013

The TAC Tutors trained 64 Class 2 teachers in Kisumu and head teachers of intervention schools in the six treatment zones of Kisumu County on the PRIMR lesson plans. The purpose of the training was to ensure that the teachers used structured lessons and aligned pupils' learning materials with the instruction. For teachers in four of the zones, the training was similar to that conducted in Nairobi. Teachers in the teacher tablet zones (Barkorwa and Nyabondo) received more targeted instruction on use of tablets in teaching. This teaching was informed by areas that needed improvement, such as use of teacher tip sheets, use of the Papaya application, and use of Tangerine:Class in undertaking classroom assessments.



Teacher training session in Otongolo Zone, Kisumu County.

Refresher Trainings, May and September 2013

In May 2013, Kisumu teachers from the six treatment zones also received the three-day refresher training from their TAC Tutor. The TAC Tutors led the same training for the teachers in Kisumu as the non-ICT teachers had received. The refresher training focused on the five reading components, reflection of successes and challenges, and use of ICT in their particular treatment group. All refresher trainings were based on issues observed during zonal meetings, at monthly meetings, or during TAC Tutor/technical staff observations. For the teacher-tablet group, the main topics were using the audiovisual lesson plans, Papaya,

undertaking assessments using Tangerine:Class, and making informed decisions based on assessment results. For the e-reader group, the training covered tracking pupils' reading habits as well as supporting pupils to read. In January 2014, the number of teachers trained rose to 456 (183 male and 273 female) while in May this number dropped slightly to 423 (165 male and 258 female). It should be noted that teachers trained in 2014 included those in the two control zones (Ahero and Chulaimbo).

4.5 ICT-Specific Teacher Support

The TAC Tutor support in Kisumu differed from that in the “traditional” PRIMR counties of Nairobi, Nakuru, Kiambu, and Murang'a. This was because one of the ICT trials tested the efficacy of TAC Tutor support. Specifically, the effect of the TAC Tutor tablet depended entirely on the pedagogical support that TAC Tutors offered teachers. That is, TAC Tutors supporting the teacher tablet and e-reader zones had to visit schools to offer support on both technical and teaching methods. The technical component entailed building the teachers' capacity in using the tablet, as well as supporting pupils in using the e-readers. Most support materials were included on the TAC Tutor tablets, which were regularly updated with revised content.

Monitoring of the TAC Tutors' support started at the end of January 2013, when they returned completed observation sheets to the PRIMR monitoring and evaluation (M&E) team. Although the TAC Tutors in Kisumu experienced breaks in their classroom observations similar to those explained above due to elections and the teachers' strike, on average, TAC Tutors' ICT support visits exceeded the two visits per term, across all three treatment groups.



A pupil from an e-reader-supported PRIMR school in Kisumu County reads a grade-appropriate electronic book.

4.6 Baseline and Endline ICT Assessments

As with the sampling frame for selecting schools for the ICT study, for both the baseline and the endline, the assessments used a survey of the schools but a sample of the students, utilizing simple random sampling.

At the zonal level, PRIMR administered baseline and endline assessments in the form of a survey, sampling all 80 ICT study schools. At the school level, both the baseline and endline studies targeted 20 Class 2 pupils per school, a head teacher, and at least one teacher from each of the 80 schools. The project team used simple random sampling at the Class 2 level to obtain a sample of 20 pupils by school. **Exhibit 9** shows the achieved pupil sample at the baseline and endline, by treatment type. At both baseline and endline, the achieved sample was quite close to the planned sample.

Exhibit 9. Achieved pupil sample by treatment group and zone, baseline and endline assessments, ICT study

Zones	Treatment										Number of schools
	Control		E-readers		Teacher Tablets		Tutor Tablets		Total		
	B	E	B	E	B	E	B	E	B	E	
Ahero	199	200	—	—	—	—	—	—	199	200	10
Barkorwa	—	—	—	—	200	196	—	—	200	196	10
Bolo	—	—	—	—	—	—	197	188	197	188	10
Chulaimbo	197	186	—	—	—	—	—	—	197	186	10
Kodingo	—	—	190	193	—	—	—	—	190	193	10
Nyabondo	—	—	—	—	199	199	—	—	199	199	10
Otonglo	—	—	200	200	—	—	—	—	200	200	10
Ragumo	—	—	—	—	—	—	198	198	198	198	10
Total	396	386	390	393	399	395	395	386	1,580	1,560	80

Key:

B=Baseline
E=Endline

The results of the endline assessment—i.e., impacts of the ICT treatment on pupil performance, as well as findings from the cost-effectiveness analysis—are discussed next and in Section 6.

4.7 Impacts of the ICT Study

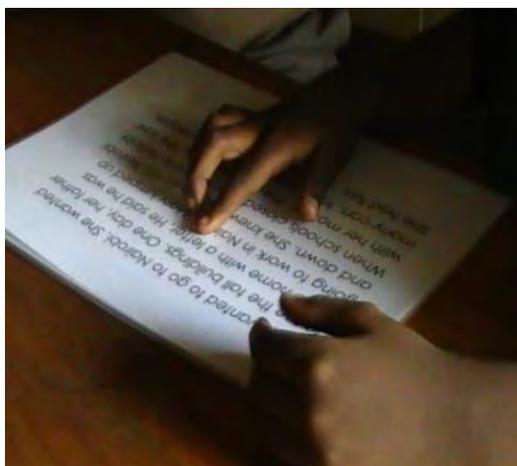
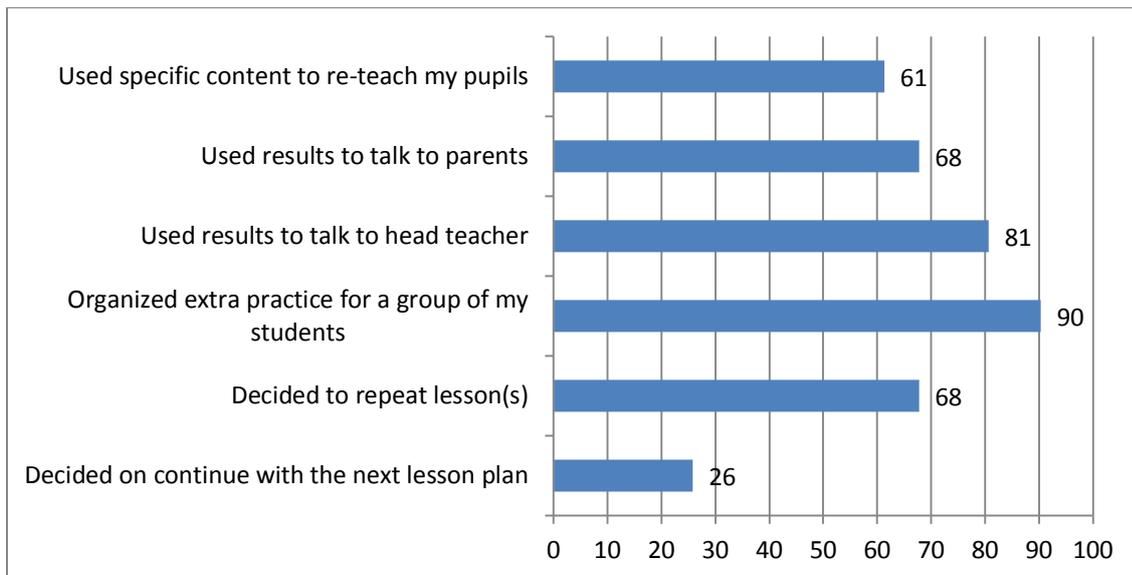
During Year 3 of the PRIMR Initiative implementation, all TAC Tutors and all coaches—not just the TAC Tutors who had participated in the ICT study—began using tablets to carry out teacher support. This decision was informed by the ICT intervention, whose results had shown that the TAC Tutor tablet was the most effective and cost-effective method of engendering ICT in teaching and learning. Use of tablets in observations made the process more efficient and quite reliable, and by the end of March 2014, the PRIMR technical team had made 505 support visits to work with all the coaches and TAC Tutors, and the Tutors and coaches had made a total of over 2,400 visits to schools within Nairobi, Kisumu, Nakuru, Kiambu, and Murang’a counties.

Development and use of assessments was also emphasized in the ICT Kisumu intervention, aided by Tangerine:Class. This application contained both formative (curriculum mastery checks) and summative assessments. Teachers and TAC Tutors had been able to select

assessment items from content that had already been taught. Formative assessments were undertaken on a weekly basis, while summative ones were completed at the end of the school term.

A review of the ICT intervention showed that teachers used assessment results from Tangerine:Class for instructional decision-making in various ways. **Exhibit 10** highlights the different instructional decisions being employed by teachers on the basis of assessment results. As can be seen, 90% of the participating teachers reported using data from regular mastery checks to identify those pupils needing remedial action and practice. Results were also used to decide whether to proceed with the subsequent lesson or to reteach earlier lessons. For individual pupils, the application could also indicate specific items that pupils struggled with. Exhibit 10 outlines the proportion of teachers reporting to take different instructional decisions based on data recorded from mastery checks in Tangerine:Class.

Exhibit 10. Teachers' uses of Tangerine:Class results



Student reading a story for progress monitoring.

Teachers used the Tangerine:Class results from the termly progress assessments to gauge whether pupils were improving in performance, specifically in their progress toward the end-of-grade targets. As assessment results were comparable from one termly assessment to the next, such classroom-based information (which also was available for individual students), provided feedback on the impact of the instructional program longer term.

5. Capacity Building at the National Level

5.1 Program Implementation: MoEST Direct Involvement in PRIMR

As indicated in the introduction to this report, throughout the course of the project, the PDIT members were instrumental in supporting the PRIMR Initiative and were involved at every stage in sharing the work plans and next steps for PRIMR. This included participating in PRIMR fieldwork activities; training TAC Tutors, coaches and teachers; participating in workshops; disseminating results; and launching PRIMR Initiative subprograms.



Elias Wanjala (DPP&EACA), James Indimuli (DQAS), Samuel Nthenge (Economist at MoEST) and other PDIT members participate on PRIMR endline findings report review in Nairobi, Pride Inn, June 2014.



PDIT members who participated in material development.

Collaboration with the MoEST and its SAGAs was enhanced through RTI's involvement in activities geared toward improving literacy and numeracy. For example, during Year 2 (2013), PRIMR held a set of joint dissemination workshops with KNEC to announce the PRIMR midterm report findings and the results of a study conducted by the Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ). This workshop was kicked off by a formal launch event, officiated by the Permanent Secretary, MoEST, at the Intercontinental Hotel. This was followed by county-level dissemination, which attracted representatives of 33 counties to better understand how PRIMR could help them. The county-level participants voiced strong positive feedback.

At the county level, PRIMR worked with the County Directors of Education and TSCs for each of the six PRIMR counties supported by both USAID and DFID. This meant jointly setting training dates, observing classrooms, and holding reading contests and zonal meetings.



Mr. Paul Wasanga, Chief Executive Officer of the Kenya National Examinations Council, presents PRIMR results at the official September 2013 launch of the midterm findings report. Key members of the MoEST, PRIMR, DFID and USAID worked together on the event.



Official launch of the PRIMR midterm report by the USAID Deputy Mission Director and the MoEST.

5.2 Policies on Early Grade Reading and Math

The PRIMR implementation influenced a number of government policies that were geared toward the improvement of primary grade reading and numeracy programs. These included the National Education Sector Plan (NESP), the Education Act, and the Sessional Paper No. 14 of 2012.

In addition, PRIMR was commissioned by MoEST to carry out studies on various current government policies and to advise on issues such as a national-scale mathematics program funded by GPE, the textbook policy, pre-service teacher education, and low-cost private primary schools in the urban informal settlements. The purpose of these studies—whose reports were submitted to the MoEST—was to provide ground for development and or revision of the relevant policies so as to enhance the quality of education through early grade literacy and numeracy.

Policy Inputs for National Scale-Up

PRIMR was responsible for providing policy support to the MoEST aimed at initiating well-informed decisions about reading policy and education quality improvement programs, based on evidence from the PRIMR innovative research methods. The goal was to present a range of policy options for improving instruction at primary school levels and going to scale. From the beginning of PRIMR, it was encouraging to note the interest in scaling up reading and math improvements across the country, and the focus on the policy environment necessary to make that happen efficiently.

The agreement about the importance of reading and lack of clarity on the scale-up strategy determined the starting point for conducting a policy study and reading research activities to improve learning outcomes in lower primary in Kenya.

During November and early December 2011, the first PRIMR policy study began. The study investigated which units within the MoEST were geared toward improving reading outcomes at scale nationally, and provided the basis for policy workshops occurring in mid-2012. The PRIMR policy specialist and an education policy consultant led the development of a policy analysis framework, prepared interview tools, and undertook the interviews with the key policy decision makers in the MoEST Directorates and SAGAs. The policy study results provided an avenue to identify the current status and possible ways in which the MoEST could reorient instructional improvements in the area of reading. The findings were collected and analyzed, and a draft report developed for discussion.

The draft policy report was presented at a workshop held in Nakuru in July 2012, with the following objectives: To validate the policy study report; to develop consensus on key policy issues for a national reading program; and to make recommendations for the next steps. The workshop was attended by senior staff from the MoEST and its SAGAs, USAID, RTI, and other NGOs.

The spirited discussion at the policy workshop dealt with the various aspects of MoEST and SAGA operations necessary to undertake a national reading and/or math program. The 10 key elements agreed upon for policy changes around reading and math and improvement of learning outcomes were:

1. Take into account the MoEST's preference for a **national reading program** to cover both early childhood development and lower primary.
2. Refocus and **redesign the reading curriculum** to emphasize the five components of reading (phonemic awareness, alphabetic principle, fluency, vocabulary, and comprehension).
3. Put in place a **system for institutionalizing** the use of instructional materials produced within research programs, encouraging education partners working in the area of mother-tongue education to support the revision of the curriculum, developing and producing instructional materials in local languages, and publishing and/or supporting the private sector to publish textbooks for teaching and learning of reading in the local languages.
4. **Increase instructional time** from the current 30 minutes to 45 minutes per reading lesson by embedding "reading across the curriculum," in order to strengthen

the learning of reading; and develop and adopt a strategy of reading across the curriculum.

5. Use the **local or the predominant language** in the school area in teaching reading and introducing Kenyan learners to reading. Introduce Kiswahili after pupils have already learned to read in their local language.
6. **Harmonize the Primary Teacher Education (PTE) curriculum** with the lower primary school reading curriculum. Emphasize the teaching of initial reading in the pre-service PTE program and Continuing Professional Support for teachers.
7. Develop a **comprehensive in-service education and training** on reading policy, and identify an appropriate home for overall effective coordination and accountability with a mandatory In-service Education and Training (INSET) course initially and every three years. The home for coordinating early grade reading was proposed to be the Permanent Secretary's office.
8. Have the Teachers' Service Commission and other relevant institutions develop and implement an **effective and sustainable TAC Tutor support system** in instructional delivery.
9. Prepare a **comprehensive reading assessment policy** on the assessment of reading competencies. Institutionalize a national reading assessment to begin at Class 3.
10. Have the SAGAs and the MoEST undertake **sustainable funding and budgeting** coordination of the reading improvement program, with coordination from the office of the Permanent Secretary of the MoEST.

The points above became the foundation of a document that was shared within the MoEST and that would influence the development of various other PRIMR policy documents in the future. The PRIMR Initiative focused on policy support to the Ministry and its agencies as a continuing process. Moreover, based on a subsequent policy concept note approved by USAID in August 2012, PRIMR's policy support to MoEST reading program changed to focus on offering advice in two main areas:

- Further developing the reading policy and management framework for the delivery of national reading services; and
- Building the capacity of a range of education and teaching personnel to deliver appropriate and high-quality education learning outcomes.

Policy Issues Stemming from the Midterm Evaluation

A number of policy issues arose from the PRIMR midterm evaluation report of October 2012.¹⁴ The list of policy challenges for PRIMR to examine was expanded further after a discussion with the Director of Policy, Partnerships and East African Affairs, Mr. Onesimus Kiminza, who advocated for specific research studies that needed addressing in Kenya. The policy issues identified for investigation included recommendations on (1) curriculum design

¹⁴ The midterm and endline results are summarized together in Section 6; see also Piper & Mugenda (2013, 2014).

and development; (2) provision of a school course book as guided by the current MoEST book policy; (3) the role of the private sector in the provision of quality education, especially within the informal settlements in the urban areas; and (4) the level of preparedness of pre-service trainees in teaching literacy and numeracy in the primary schools upon graduation from the colleges.

It was noted that the curriculum issues would be addressed during the envisaged curriculum reform—as highlighted in the Sessional Paper Number 14 of 2012 (*A Policy Framework for Education and Training on Reforming Education and Training Sectors in Kenya*). Mr. Kiminza requested that the other three studies be undertaken immediately so that the findings could feed into the Kenya's education reform efforts. It was envisaged that the PRIMR policy study findings would guide the MoEST in planning and decision making, given that improving literacy and numeracy is an investment program within the NESP.

Key aspects of these three policy studies are summarized below.

Textbooks

PRIMR was requested to undertake a comprehensive and in-depth study on the existing textbook policy, with a view of proposing strategic and effective options for consideration by the government. Primary data collection for this policy study (in March 2014) on availability of textbooks in Kakamega County revealed that 46% of the primary schools sampled had average textbook–pupil ratios of 1:10 in English, Kiswahili, and mathematics, in spite of the large infusions of funds for this purpose over the past decade. The study proposed the following book policy options.

Policy Option 1: County-level distribution. Distribution of the books to schools would be done at the county level, thus eliminating the direct channeling of finances to schools. Private publishers would continue to participate in the competitive vetting and selection process by KICD, but would also be expected to get approved requisitions for all the schools from the respective County Education Board (CEB) and take responsibility for delivering the books to the schools. The schools and the CEB would then verify the deliveries before payments were made by the central government, potentially reducing the financial leakages in the current process.

Policy Option 2: Central control of learning material development. This option proposes that essential textbooks for use in literacy and numeracy in lower primary be prepared by a group of curriculum specialists under the tutelage of KICD, and the cheapest source for their publication being sought competitively. This would ensure appropriate content delivery using the most suitable pedagogical approaches and at an affordable cost. Pilot projects by initiatives such PRIMR have proved that the cost of producing textbooks in the schools can be much cheaper. The study recommended segmentation of the primary cycle; this model could be introduced in lower primary, ensuring equitable and affordable provision of textbooks for the foundational classes at primary level.

Policy Option 2a: Tusome national pilot. Due to the significant impacts of PRIMR's teaching and learning materials on pupil performance, even above that of other textbooks in the market, the forthcoming USAID *Tusome* project could be viewed as a national rollout of an experimental study that has requisite materials (PRIMR books) that have been constructed

to meet the pedagogical approaches being advanced in the initiative. Combined with training and support to KICD and the publishers in the market, this would solve the short-term problems of having low-cost, high-quality materials available, while providing the book policy stakeholders with the technical expertise to improve the quality of their textbook development as well as the quality of the vetting process at KICD.

Policy Option 3: Updated price guidelines for books. The MoEST would review the existing policies in light of the study findings, and propose solutions to ensure lower-cost books. Revisions to the pricing guidelines are urgent, considering that the existing textbook-to-pupil ratios in schools are alarming in spite of the relatively generous Free Primary Education and Free Day Secondary Education funds sent to schools by the government. This option proposed the retention of the status quo in the vetting and publishing structures, except in the area of book costs. One simple solution would be for the KICD Orange Book's suggested prices to include discounts for the consumer after the initial print run. Many challenges exist that are symptomatic of a system that lends itself to leakages and outright corruption, and all of the respondents of this study except principals and head teachers wanted to see this system significantly altered.

The key recommendations of this study were (1) to support KICD to overhaul its textbook vetting process to ensure the usage of research-based evidence to ensure quality, citing other countries (among them Uganda and Ethiopia) that had overhauled their vetting processes; and (2) to make dramatic decisions on how to ensure that the overall book policy gives Kenyans an opportunity to have learning materials in their hands at low cost.

Other key recommendations arising out of the study included:

- Review the current textbook policy in Kenya, specifically with regard to evaluation, production, distribution, and cost of textbooks.
- Reexamine the curriculum construction processes by KICD with a view to putting research at the center of the curriculum development, and embracing 21st-century modalities for learners to acquire competency.
- Reexamine the vetting instruments for textbooks based on current research on curriculum construction and pedagogical instruction and evaluation.

Low-Cost Private Schools

The MoEST's Directorate of Policy, Partnerships, and East African Affairs requested the PRIMR study of policy options regarding low-cost private schools. Because parents choose to pay a small fee to send their children to these schools, in order to continue operating, the schools are forced to provide a level of quality that keeps parents paying fees. Of particular interest to the MoEST were how parents defined education quality, and how they perceived public and low-cost private schools in the context of quality. The study involved both a literature review and primary data collection. The findings report listed three significant policy options and several recommendations.

Policy Option 1: Charters and subsidies. Many parents believe LCPSs produce a high quality of education. The Ministry could support these schools by creating a structured registration process for LCPSs that established minimum expectations for quality. This would allow MoEST to assign each pupil a unique identifier that would be accompanied by a capitation

grant and associated funding for teacher salaries, allowing funding to follow students instead of schools. PRIMR suggested a small-scale pilot in an urban county to determine viability at a national scale.

Policy Option 2: Relaxed registration of LCPSs. The MoEST could drastically streamline the registration process so that LCPSs would be more likely to register, and thereby facilitate support, standards, and measurement of enrollment, for example. The LCPS head teacher interviewees suggested the chief reason for lack of registration was their perspective that the registration requirements of the MoEST were too onerous. This option would require the MoEST to relax its requirements with respect to physical space and teacher training, for example. The requirements could be worded precisely enough that not all schools could be registered, especially if their quality was low; but relaxed enough for many more LCPSs to be willing to formally register.

Policy Option 3: Maintaining of current registration procedures for LCPSs. This is the status quo, in which LCPSs find it difficult to register with the MoEST due to requirements that do not take into account the realities of LCPSs. Many LCPSs do not meet expectations for physical space allocated for play and classrooms, or hire teachers approved by the TSC. At least two studies¹⁵ have shown that these expectations do not affect quality.

The study's findings lent themselves to several key recommendations.

1. **Establish a public-private partnership with the LCPS subsector.**
Recommended steps would include simplifying the registration process and creating a system to take an accurate count of pupils in public schools and LCPSs, allowing for a mechanism of subsidies to the LCPS sector that would include both the full capitation grant and funds for paying teachers that follow pupils, thereby leading to incentives for all schools to improve.
2. **Examine hidden costs of education.** The MoEST should carefully investigate the additional and ancillary costs that are increasingly being applied to public school attendance, such as extra tuition costs, examination fees, meal costs, materials costs, and many others. This limits the effectiveness of public schools in this area, as public schools were primarily attractive due to their low cost.
3. **Reduce costs to families.** MoEST should ensure that the KICD's "Orange Book" (procurement specification) costs are lessened in the future. These extra funds could be spent on more resources for teacher professional development and instructional support.
4. **Improve instructional delivery in all school settings.** The PRIMR Initiative has shown that it is possible to dramatically improve outcomes with the support of TAC Tutors. The TAC Tutor and Quality Assurance and Standards (QAS) systems should be used to ensure instructional improvement.
5. **Improve teachers' professional training in the LCPS subsector.** Results from PRIMR's early primary student assessments showed low achievement levels,

¹⁵ See (1) Oketch, M., Mutisya, M., Ngware, M., Ezech, A. C., & Epari, C. (2010). Free primary education policy and pupil school mobility in Urban Kenya. *International Journal of Education Research* 49, 173–183; and (2) Piper, B., & Mugenda, A. (2014).

but also proved that pupil performance responds strongly to teachers' professional development, as delivered by successful literacy and numeracy improvement programs.

6. **Involve communities.** The MoEST should increase the amount of reliable information available to communities about education quality. Parents are mainly using Kenya Certificate of Primary Education (KCPE) results to make determinations about school quality. There are many other characteristics of education quality that communities should be able to take into account using the new QAS meriting tool.
7. **Accept private schools.** The MoEST and Kenya as a whole should embrace the private school education system. A vibrant educational community in Kenya would be one in which educational innovations in the LCPSs and public schools mutually reinforce each other, allowing for Kenyan pupils to benefit from competition and knowledge sharing across the subsectors.

Pre-service and Continuing Professional Development in Kenya

This study was commissioned by the MoEST to advise on the implications of the early learning improvements in the PRIMR Initiative approach for the pre-service sector. To undertake the study, MoEST officials across the relevant Directorates (Basic Education; Policy, Partnerships and East African Affairs; Quality Assurance and Standards) were interviewed, as were the Directors and experts at KICD, TSC, and KNEC. In addition, principals and subject experts at Primary Teacher Training Colleges were interviewed. All interviews were completed according to protocols developed alongside technical experts at the MoEST. Many participants felt that the success of any pre-service sector reform will depend on developing a coherent policy framework that deals with the complexity of Kenya's pre-service sector as an integrated whole.

The findings of the study were analyzed and several key recommendations for Kenya's pre-service sector were established, as follows:

1. **Reform the PTE curriculum** to respond flexibly to new approaches in instruction of early grade reading and math, such as those successfully tested in the PRIMR Initiative. This reform needs to extend and be aligned to the primary education curriculum.
2. The PTE course should be extended to a **three-year diploma course**. This would give trainee teachers solid preparation for effective classroom teaching and increase knowledge of theory, pedagogy and practice.
3. Universities should develop a distinct **curriculum for teacher trainers**, such as the current University of Nairobi course under development.
4. **Develop an INSET program** of knowledge and innovative pedagogical skills in literacy and basic numeracy to equip trainers, TAC Tutors, coaches, and practicing teachers. Development of a broader continuous professional development (CPD) program would augment professional growth and keep the trainees abreast of innovative 21st-century approaches.

5. **Establish an institution for CPD** (such as Israel's model) and put in place a three-to five-year program specifically for teachers and lecturers. The course would use a holiday training modality to ensure high attendance and adequate coverage. The certificate awards for the trainings should be given weight by the TSC in promoting teachers and recognizing them for further employment and promotions.
6. A stakeholders' conference to **develop the teacher education policy framework** is crucial. This framework should be used to harmonize the many aspects of policy and practice in teacher education and practice. Critically, the many SAGAs and Directorates in the MoEST that work on pre-service issues should have an integration mechanism so that the combined efforts of these institutions result in an effective pre-service program. The framework should address training the teacher trainers at institutions of higher learning and developing a comprehensive CPD program for various cadres of TSC employees.
7. It is necessary to explore establishing a **volunteer program or internship for newly qualified teachers (NQTs)** to ensure that the acquired knowledge is not forgotten by the time teachers are in full employment, especially if there is delay between PTTC completion and employment. The program could serve as a stop-gap measure for addressing teacher shortages in schools.
8. The TSC should use NQTs' probation period as a **mentorship phase** during which the NQTs would work under an experienced senior teacher or professional. The teaching practice program should be converted into a one-year teacher training/internship both as a stopgap and to ensure that NQTs are well grounded in both pedagogy and attitudes toward instruction by the time they are fully employed.

Setting Benchmarks

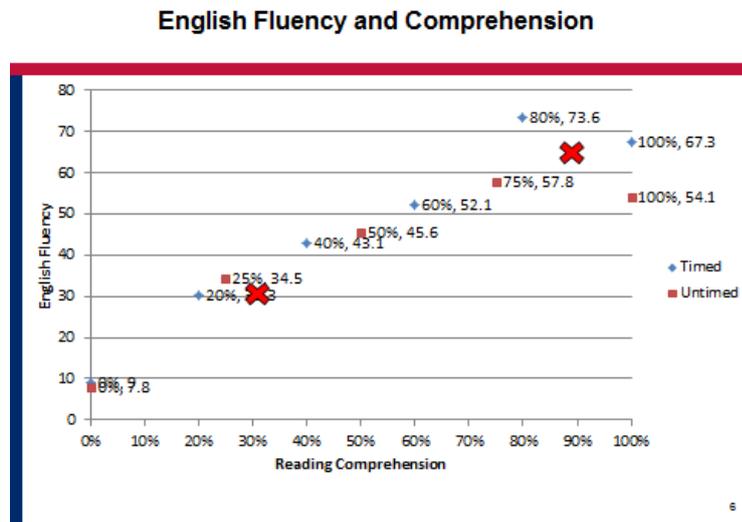
PRIMR was invited to support MoEST capacity to implement standardized research programs by working with the Kenya National Examinations Council in setting benchmarks for reading and numeracy. In August 2012, PRIMR presented the results of its baseline report to the KNEC Steering Committee, with an eye toward agreeing on appropriate benchmarks for student learning for fluency and comprehension in Kenya. Workshop participants were drawn from the Canadian International Development Agency, UNICEF, the World Bank, the Japan International Cooperation Agency, KNEC, and the MoEST.

PRIMR made three presentations to the Steering Committee: one by Dr. Abel Mugenda on the PRIMR research design, another by Chief of Party Dr. Benjamin Piper on the baseline findings and recommendations, and the last by Dr. Piper on benchmark setting. The benchmark-setting presentation gave PRIMR an opportunity to show the levels of student learning quite precisely.

Exhibit 11 shows one of the charts presented to the Steering Committee, looking at oral reading fluency scores on the y axis and reading comprehension scores on the x axis. The scatterplot had two colors, red for the untimed assessment (40 words, 180 seconds) and blue for the timed assessment (60 words, 60 seconds). The participants were asked to determine where to put the "X's" to estimate what levels of fluency pupils needed for 80% and 100% comprehension (fluent readers). They were also asked to determine where to put

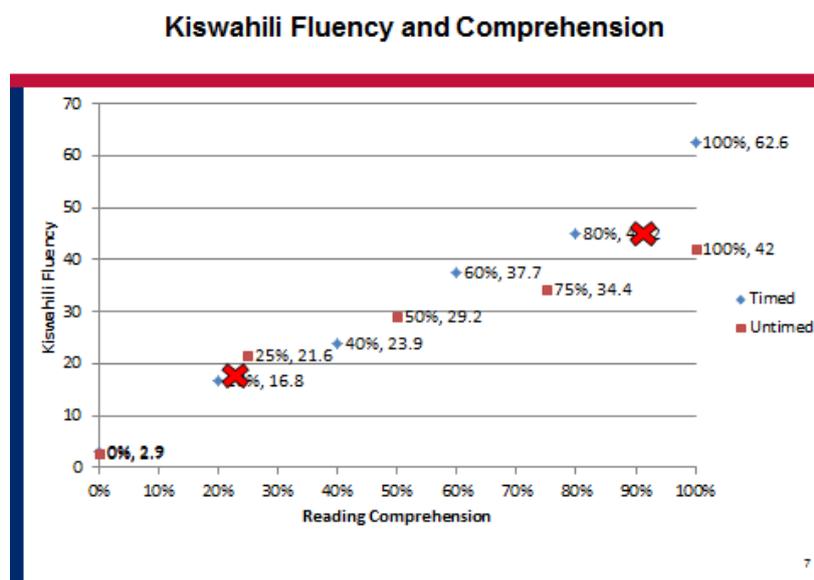
the X's to show what levels of fluency pupils needed to have at least 20% comprehension (emergent readers). Exhibit 11 shows what options they chose.

Exhibit 11. Fluency and comprehension rates for English benchmarks, selected using PRIMR baseline data



Participants discussed the Kiswahili data as well, with the same assumptions and research design. While the students' performance outcomes were much different in Kiswahili, **Exhibit 12** shows the relationship between fluency and comprehension for timed and untimed reading.

Exhibit 12. Fluency and comprehension rates for Kiswahili benchmarks, selected using PRIMR baseline data



The participants deliberated on this information and other data presented in the workshop. They agreed unanimously to select the benchmarks of fluency (as related to comprehension)

for Kiswahili and English presented in **Exhibit 13**, using the unit of correct words per minute (cwpm). Note that the greater length of words in Kiswahili—an agglutinative language—was the primary reason for its lower benchmark levels.

Exhibit 13. Fluency benchmarks for Kiswahili and English

Language	Emergent reader	Fluent reader
Kiswahili	17 cwpm	45 cwpm
English	30 cwpm	65 cwpm

5.3 Support to KNEC

Development of National Meriting Tool

PRIMR M&E staff provided support to KNEC in developing a Kenya Quality Education Meriting Tool. They did so by proposing a tool that would be used to measure learning outcomes in the early grades. The tool was modeled on the EGRA and EGMA tools used in PRIMR. The one for English and Kiswahili assessment consisted of a passage with comprehension questions. The mathematics tool contained addition and subtraction tasks of varying difficulties.

The tools were further simplified by inclusion of the MoEST’s benchmark scoring levels. For example, in reading, scores for emergent and fluent reading were 17 cwpm and 30 cwpm in Kiswahili; and 45 cwpm and 65 cwpm in English. The emergent and fluent mathematics score levels were 8 correct addition items per minute (capm) and 12 correct subtraction items per minute (cspm).

Review of Questionnaires

In building support of the MoEST and SAGAs in undertaking standardized research, PRIMR provided technical support in development and review of questionnaires.

For example, in June 2014, the M&E staff was tasked with reviewing the Monitoring Learning Assessment Form II for KNEC.

6. PRIMR Impact Evaluation

In order to understand PRIMR’s effectiveness and to answer the research questions it had posed, an impact evaluation study was designed and implemented. This study had several components, including a longitudinal component that followed approximately 600 Cohort I Class I students from the beginning through the end of the project, at the end of their Class 2 year. The research also evaluated the impact and cost-effectiveness of the Kisumu ICT study. Pupils were assessed at three time points: baseline (January 2012), midterm (October 2012) and endline (October 2013). **Exhibit 14** shows the locations and dates of the data collection efforts.

Exhibit 14. Locations and dates of data collection

Counties	Assessment period			
	Jan 2012	Oct 2012	Jan 2013	Oct 2013
Nairobi, Nakuru, Murang'a, Kiambu	Baseline	Midterm		Endline
Kisumu County (ICT study)			Baseline	Endline

The subsections below describe the steps involved in the evaluation process, followed by a summary of the results.

6.1 Development of Reading and Mathematics Evaluation Tools: EGRA, EGMA, and SSME

A critical portion of the impact evaluation would be the assessments of pupil performance at the three time points. Thus, just after PRIMR's launch in August 2011, a technical team specializing in test and item construction met to discuss how to update and adapt the EGRA, EGMA, and SSME tools for use in the PRIMR Initiative. Informed by research findings from previous EGRA and EGMA assessments in Kenya, the workshop participants made decision about what to include in each instrument.

The technical team discussed various tasks and decided that the EGRA in English would comprise: letter sounds, unfamiliar words, passage reading (fluency), and passage reading comprehension. The EGRA in Kiswahili would contain the following tasks: letter sounds, syllable fluency, passage reading (fluency), passage reading (comprehension) and listening comprehension. Later versions of the EGRA included additional tasks created to measure specific skills for pupils, and to assess their efficacy in the Kenyan context.

For EGMA, the technical team agreed on: rational counting, number identification, number discrimination (larger/smaller), missing number, addition levels 1 and 2, subtraction levels 1 and 2, and word problems.

Additionally, the team decided to use classroom observations for both reading and math, classroom inventories for reading and math classrooms, teacher interviews, and head teacher interviews to produce the school snapshot via the SSME survey.

6.2 Data Sets

The PRIMR impact evaluation procedures entailed collecting two major sets of EGRA/EGMA/SSME data. The first covered the four counties—Nairobi, Nakuru, Murang'a, and Kiambu—that had joined the program in January 2012. The second data set measured the impact of the three ICT treatments in PRIMR formal schools (Section 4) and was collected in participating zones of Kisumu County.

Throughout the project, smaller assessments were also conducted to assess progress, but were not used to report final impact.

6.3 Treatments and Samples

Recall from Section 1.3 that the USAID-funded portion of the PRIMR Initiative supported 547 schools during the period 2011–2014. These schools were randomly selected into PRIMR and assigned to treatment and control groups following strict statistical procedures.

In this **first sampling stage**, zones were selected from counties, stratified by district. These zones were then randomly assigned to treatment groups.

For the impact evaluation, the **second-stage sample** consisted of schools randomly selected from within all the zones selected for PRIMR. The schools sampled during the midterm study were maintained for the endline study. This was determined to be appropriate after an investigation of the frequency of classroom visits of TAC Tutors to schools selected for the baseline; visit frequency for those in the baseline and those not in the baseline did not differ.

- For the **baseline assessment**, zones and clusters were randomly selected from the counties or regions that were agreed upon among the MoEST, RTI, and USAID. Approximately 50% of the PRIMR treatment and control schools were picked for assessment in the selected zones and clusters.
- At **midterm**, the same procedures were followed and approximately 50% of the schools were again randomly selected, but only for Cohort 2. Note that the schools selected for assessment in Cohorts 1 and 3 were maintained at midterm because the pupils selected from these schools formed the aforementioned longitudinal sample of specific students who would be traced and assessed at all three time points.
- For the **endline** study, it was decided that the same sample of schools used at midterm should be maintained for endline, given the failure of the school selection process to influence the number of classroom visits made by TAC Tutors and coaches.

A **third sampling stage** involved systematic sampling of Class 1 and 2 pupils in the selected schools, stratified by gender and class.

Recall that the LCPSs—a subset of the 547 PRIMR schools—were divided evenly, with half assigned to clusters with a school-to-coach ratio of 10:1 and the other half 15:1. Hence, in 2012, three LCPS treatment clusters had a school-to-coach ratio of 10:1 and two clusters had a school-to-coach ratio of 15:1. In 2013, 8 clusters were at 10:1 and 7 clusters were 15:1. Comparing the outcomes of pupils in these two groups was expected to help PRIMR advise the MoEST on the most cost-effective school-to-coach ratio that would significantly improve learners' outcomes in literacy and numeracy.

Exhibit 15 illustrates the samples for the three stages of data collection, and **Exhibit 16** shows the numbers of pupils assessed at endline, disaggregated by gender and class.

Exhibit 15. PRIMR non-ICT impact evaluation sample, by cohort and year

		2012	2013	2014
Cohort 1		125 schools 66 public, 59 LCPS		
Cohort 2		185 schools 65 public, 120 LCPS		
Cohort 3 (Control)		101 schools 51 public, 50 LCPS		
Pupils assessed	Baseline, January 2012		Midterm, October 2012	Endline, October 2013
Cohort 1	1,335		1,320	1,300
Cohort 2	1,860		1,850	1,876
Cohort 3 (control)	1,190		992	1,046
Total	4,385		4,162	4,222

The total number of schools assessed during the endline was 214. In all, 4,222 pupils were assessed at the endline compared to 4,166 pupils at midterm and 4,385 pupils at baseline. Based on PRIMR's power calculations, this sample size was considered sufficient to detect an impact of at least 0.20 standard deviations (SD).

Exhibit 16. Endline sample size by gender and class

Gender	Class 1	Class 2	Totals
Girls	1,052	1,054	2,116
Boys	1,058	1,058	2,106
Totals	2,110	2,112	4,222



Assessing a pupil using a tablet.

6.4 Data Collection Procedures

Data collection for each of the three assessments involved data collectors who had been trained by experienced PRIMR staff and who had participated in previous Kenya EGRA and EGMA assessments. The baseline data collection in January 2012 was conducted using paper instruments and lasted 18 days with data entry January 30–February 23. By the time of the midterm data collection in October 2012, RTI had developed the digital data collection tool Tangerine, and Kenya became the first country to use the tool for a large-scale data collection. Data collectors were specially trained to use tablets

loaded with Tangerine. This approach greatly decreased the number of administration errors and time for data entry, cleaning, and processing. In October 2013, the endline data collection took place again using the Tangerine tool on tablets. Data collection on ICT Kisumu impact surveys (both baseline and endline) was also undertaken with tablets and Tangerine.

6.5 Major Findings: Pupil Performance

Pupils' Reading and Comprehension, in English and Kiswahili

The PRIMR Initiative's major accomplishment was a dramatic improvement of early grade literacy outcomes. By the last phase of implementation, the number of schools reached under the intervention in the five counties of Nairobi, Nakuru, Kisumu, Kiambu, and Murang'a had increased from 125 to 547. On the same note, the number of pupils benefitting from the intervention increased from 12,755 in January 2012 to 56,036 in the final year of implementation.

Trends in performance in English and Kiswahili showed improvement from baseline to endline. This improvement was tracked against the KNEC benchmark reading levels. Recall from Exhibit 13 that for English, the "emergent" fluency level was 30 cwpm while "fluency" level was at least 65 cwpm. In PRIMR schools, the percentage of pupils reaching the emergent level on the EGRA¹⁶ in Class 1 was 6.3% at baseline (January 2012); 45.0% at midterm (October 2012), and 47.6% at endline (October 2013). In Class 2, 8.6% of pupils reached the 65 cwpm threshold at baseline, 34.0% at midterm, and 47.3% at endline.

A similar trend was observed in Kiswahili. Again from Exhibit 13, the benchmark rates were 17 cwpm for the emergent level and at least 45 cwpm for the fluent level. In Class 1, 9.9% of pupils taking the Kiswahili EGRA reached emergent level at baseline, 55.8% at midterm, and 55.6% at endline. In Class 2, 5.8% were reading at the required fluency level of 45 cwpm at baseline. After almost 10 months of intervention (at midterm), this percentage increased to 27.1%, but it dropped slightly to 24.5% after almost 20 months of intervention (at endline). Despite the decrease in the percentage, however, the absolute number of pupils increased in every new phase of the intervention.

The improvement in reading scores was accompanied by improvements in comprehension levels. In English, the percentage of pupils scoring at least 80% on the comprehension questions in Class 1 increased from 0.3% at baseline to 5.9% at endline, while that in Class 2 grew from 5.2% to 23.8% in the same period. Growth in Kiswahili comprehension levels was similar: 0.3% of Class 1 at baseline and 5.2% at endline were able to answer at least four out of five comprehension questions correctly. In Class 2 and at the same measure, the percentage improved from 6.9% to 22.2%. *All these measures surpassed the anticipated gains by between two and three times.*

Although the number of pupils supported in 2013 nearly tripled from the year before, the proportion of pupils reading at benchmark by the time of the endline assessment was more than twice as high in treatment (28.3%) than control schools (12.6%). The impact of PRIMR also was felt on the proportion of pupils reading at the KNEC benchmark for English (65 or more cwpm), with more than twice as many treatment pupils reading at benchmark in both Classes 1 and 2.

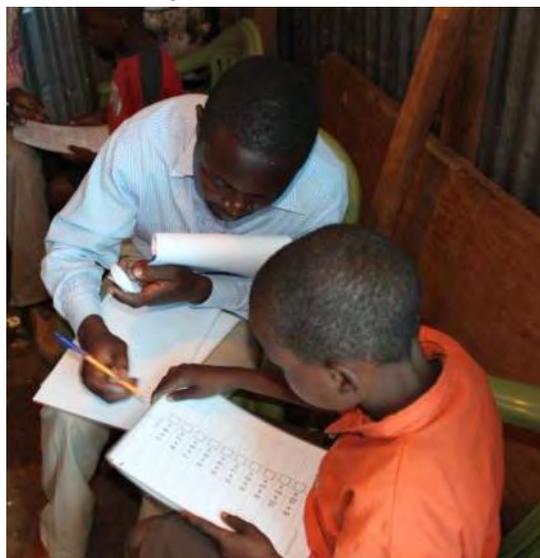
¹⁶ For reference, we repeat here the subtasks selected for the original EGRA in Kenya. **English:** letter sounds, unfamiliar words, passage reading (fluency), and passage reading comprehension. **Kiswahili:** letter sounds, syllable fluency, passage reading (fluency), passage reading (comprehension) and listening comprehension.

Pupils' Basic Math Abilities

Even though the EGMA measures involved more than seven subtasks,¹⁷ for the purpose of measuring basic improvements in mathematics outcomes, the PRIMR M&E team focused on basic addition and subtraction. Further, they established two levels of benchmarks for both measures, as follows: percentage of Class 1 pupils scoring at least 8 capm or cspm and percentage of Class 2 pupils scoring at least 12 capm or cspm.

Overall, the success of PRIMR is shown in the increment from baseline to endline of the number of pupils by class who reached the established numeracy benchmarks. In Class 1, the percentage of pupils who scored at least 8 capm in addition was 12.0% at baseline, 43.5% at midterm, and 53.2% at endline. Similarly, in Class 2, those who scored at least 12 capm were 13.3% at baseline, 41.6% at midterm, and 61.0% at endline.

Improvement in subtraction was also noted, albeit low when compared to that in addition. At baseline, 3.8% of pupils in Class 1 scored at least 8 cspm at baseline, 15.9% at midterm, and 29.4% at endline. In Class 2, those scoring at least 12 cspm increased from 2.9% at baseline to 24.7% at midterm.



A child completing the EGMA addition subtask at a low-cost private school in Nairobi.

6.6 Data Responses to Research Questions

This section addresses the PRIMR research questions introduced in Section 1.2.

Research Question 1: What is the impact of a targeted instructional improvement initiative on student achievement?

Impact of Instruction on Reading Results

In order to determine the PRIMR impact, the data analysts used a difference-in-difference model fitted on multiple regression models, with control variables to remove the baseline scores. The exhibits that immediately follow display only gains in respective treatments. The gray bars represent the gains of PRIMR treatment pupils on a given subtask over the baseline scores, while the white bars represent the gains of the control pupils on a given task over the baseline. The difference between the gray and white bars therefore reflects the growth attributable to the PRIMR program.

Exhibit 17 shows the changes since the baseline for Class 1 pupils. For English letter-sound fluency, the gain for treatment pupils was 21.3 letters, compared to 7.6 letters for control pupils. This shows a causal effect of 13.7 correct letters per minute (clpm). Stated another way, this also shows that, for letter-sound fluency, treatment pupils gained nearly three

¹⁷ The original EGMA subtasks were: counting, number identification, number discrimination, missing number knowledge, addition levels 1 and 2, subtraction levels 1 and 2, and word problems.

times as much as did the control pupils. Exhibit 17 shows that gains since the baseline were larger for treatment pupils than for control pupils on all tasks, for both English and Kiswahili. Moreover, the gains were much larger for treatment than for control for the key measures of the percentage of pupils reading at benchmark and the percentage of pupils comprehending 80% or more. For these outcome variables, PRIMR’s treatment results were three or four times higher in Class 1.

Exhibit 17. Reading gains since baseline for treatment and control pupils in Class 1, English and Kiswahili

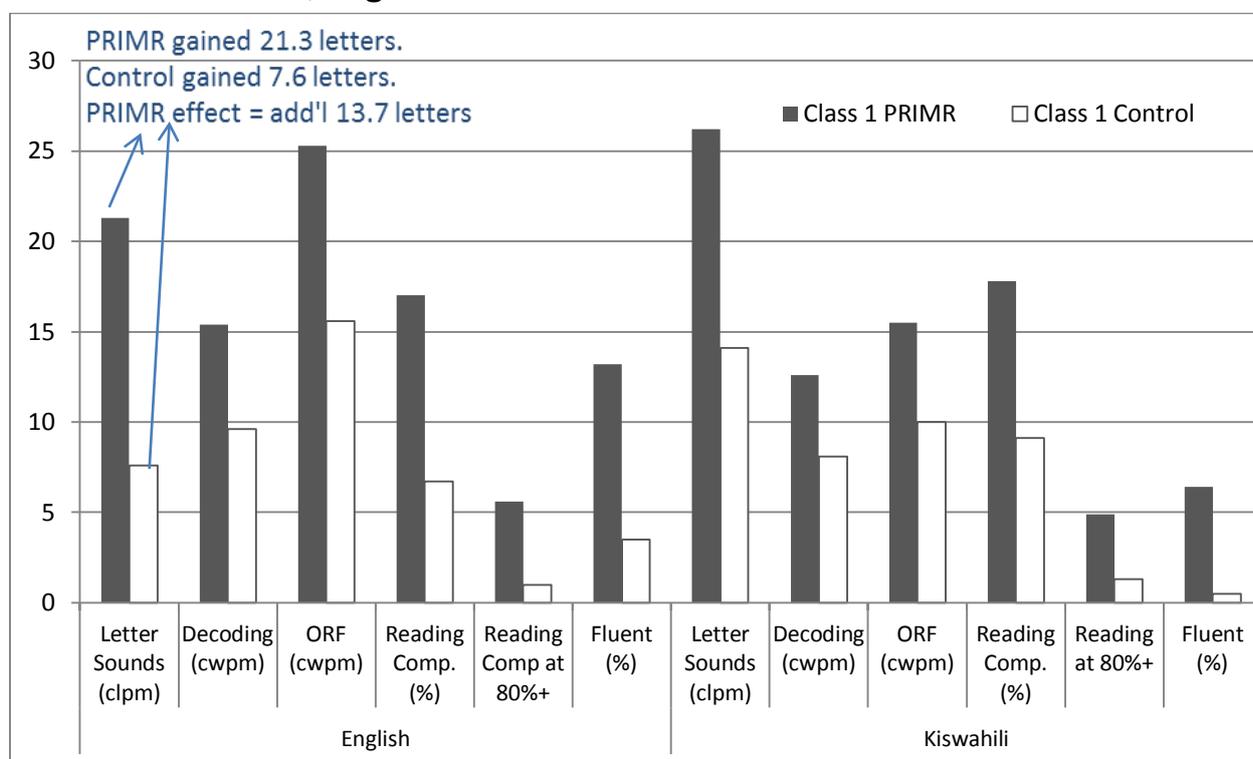


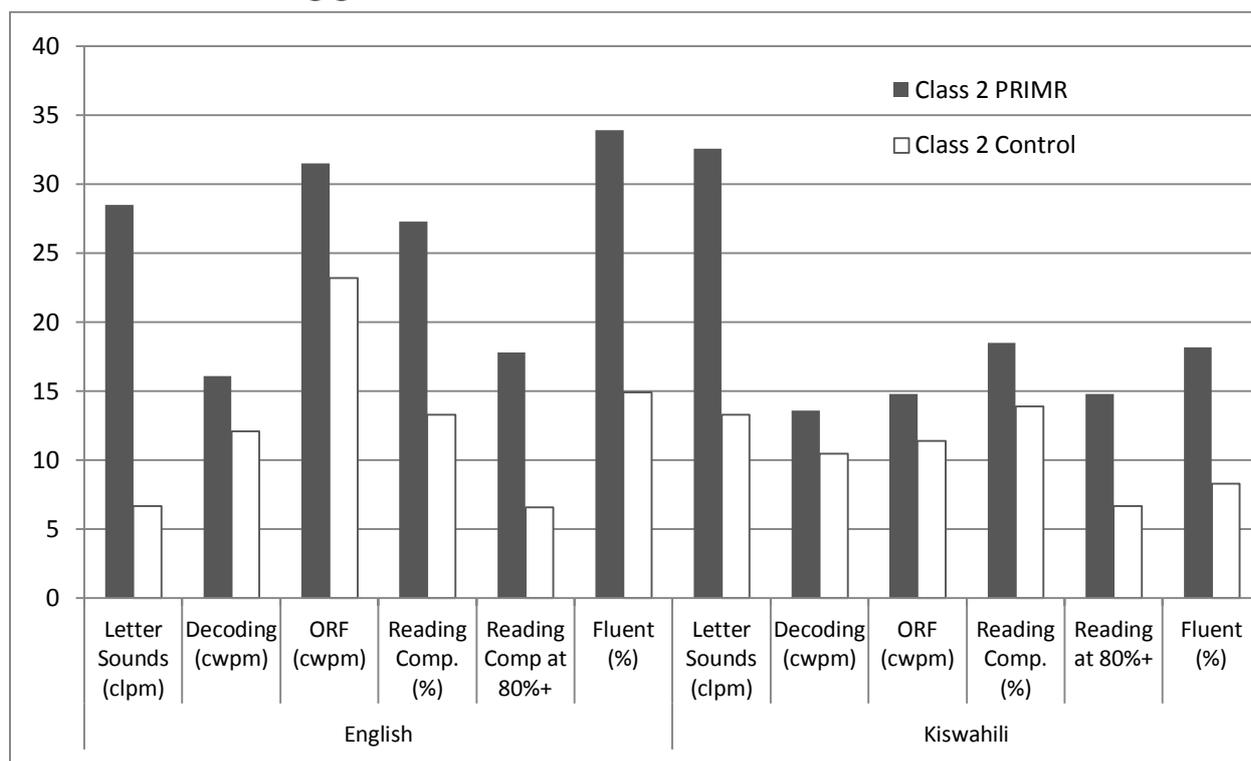
Exhibit 18 presents the gains since the baseline for treatment and control pupils in Class 2 across all subtasks, measured at baseline and endline, similar to the figure above for Class 1. Results from the differences-in-differences models for Class 2 showed statistically significant improvements by treatment pupils for all subtasks in both English and Kiswahili. The magnitude of the PRIMR impacts differed by subtask, with relatively modest impacts on decoding fluency,¹⁸ but much larger impacts on the percentage of pupils able to read at the KNEC benchmark and the percentages of pupils comprehending 80% or better.

Exhibit 18 shows the magnitude of the PRIMR effect, which might have been understated in a simple examination of the endline results. Given that Kenya’s education system saw some achievement from control pupils even in Class 1, it is important to compare how much additional learning occurred both within and beyond the program since its inception. In Kenya, particularly in Class 2, these pupils were learning. Oral reading fluency gains were more than 20 and 10 cwpm in English and Kiswahili, respectively. So to be statistically

¹⁸ Note that “decoding” for the EGRA meant reading unfamiliar (made-up) words.

significant, PRIMR’s results would have to be quite large. Exhibit 18 shows that the results were, in fact, quite substantial for treatment pupils in Class 2.

Exhibit 18. Reading gains since baseline for PRIMR and control in Class 2



Impact of PRIMR Instruction on Math Results

The PRIMR mathematics program showed modest positive results at midterm. However, given the very limited amount of time that the books and teachers’ guides were in classrooms during Year 1 of the intervention (i.e., July to October), the researchers were not convinced that any positive effect for math was due to the program, so they did not claim a significant impact on outcomes. In 2013, however, the math materials were in schools in January and the training between literacy and numeracy was done concurrently.

Exhibit 19 presents the impact of PRIMR on mathematics outcomes at the October 2013 endline. It shows a modest effect of PRIMR on math, of 0.16 SD for Class 1 and 0.26 SD for Class 2. PRIMR seemed to improve outcomes on number identification (0.27 SD), and missing number (0.29 SD), but had no effect on quantity discrimination (0.03 SD). The computational measures showed some effect, with higher outcomes in addition fluency, addition level 2, subtraction fluency, and subtraction level 2. For the most part, the impact was larger in Class 2 than it was in Class 1, and sometimes the impact was statistically insignificant in Class 1. Word problems showed a small impact (0.13 SD), once again larger in Class 2 than in Class 1. This is evidence of a moderate positive impact of the PRIMR math program on pupil achievement in math.

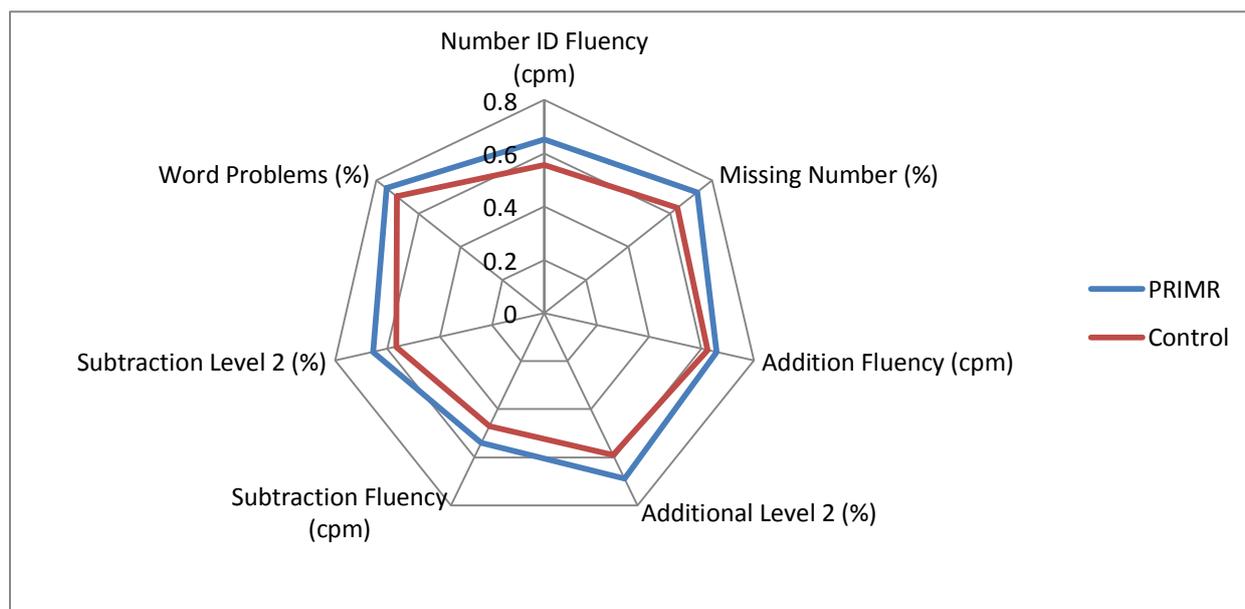
Exhibit 19. Endline impact of PRIMR treatment on mathematics outcomes (all measures)

Subtask	Overall			Class 1			Class 2		
	PRIMR	Control	Effect size	PRIMR	Control	Effect size	PRIMR	Control	Effect size
Number identification (correct numbers per min.)	24.5	21.3	<i>0.27</i>	19.6	16.7	<i>0.31</i>	29.6	25.7	<i>0.33</i>
Quantity discrimination (% correct comparisons)	59.9	59.2	<i>0.03</i>	48.4	44.6	<i>0.16</i>	72.0	73.0	<i>-0.04</i>
Missing number (% correct)	43.5	36.8	<i>0.29</i>	32.8	28.6	<i>0.23</i>	54.7	44.6	<i>0.45</i>
Addition fluency (correct addition items per min.)	10.1	9.3	<i>0.17</i>	7.9	7.5	<i>0.10</i>	12.4	10.9	<i>0.33</i>
Addition level 2 (% correct)	34.2	26.8	<i>0.23</i>	20.7	17.7	<i>0.12</i>	38.3	35.4	<i>0.08</i>
Subtraction fluency (correct subtraction items per min.)	7.1	6.2	<i>0.21</i>	5.4	4.7	<i>0.18</i>	8.9	7.5	<i>0.34</i>
Subtraction level 2 (% correct)	21.9	15.4	<i>0.24</i>	13.1	11.3	<i>0.09</i>	31.1	19.2	<i>0.38</i>
Word problems (% of 5 items correct)	40.7	37.4	<i>0.13</i>	33.9	31.6	<i>0.10</i>	47.8	42.9	<i>0.18</i>
Average effect size			0.20			0.16			0.26

Recall that 2012 saw very little time for PRIMR mathematics to be implemented prior to the midterm analysis: approximately 6 weeks. The 2013 academic year was, for all intents and purposes, the first year that the PRIMR mathematics intervention was fully implemented.

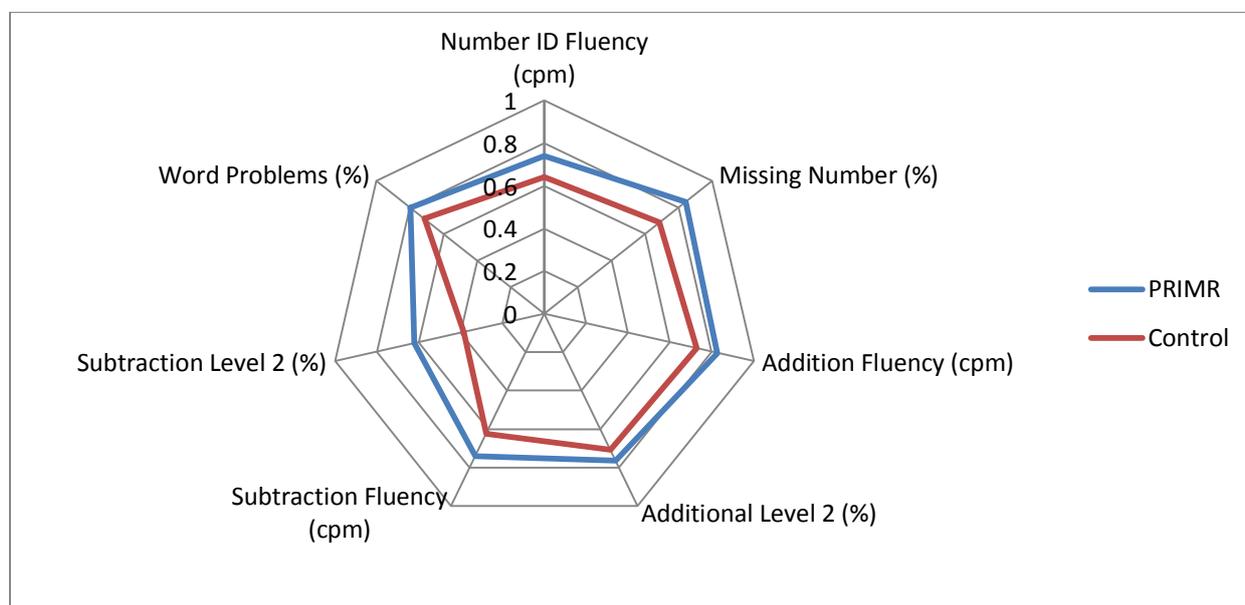
Exhibit 20 shows that treatment pupils in PRIMR outperformed their control counterparts in all areas of mathematics in Class I. However, the magnitude of the difference was relatively small. For example, the gaps in addition fluency between treatment and control were statistically significant but substantively small. Earlier parts of this report showed that the PRIMR effect size in math was smaller in Class I than in Class 2. In both PRIMR and control schools, the results were such that the outcomes remained somewhat far from the benchmark at the end of Class I.

Exhibit 20. Math, Class 1: PRIMR and control groups, mean scores and benchmarks, for each subtask



Turning now to Class 2 comparisons, the results showed a similar dramatic difference between treatment and control on the majority of subtasks. The impact of PRIMR treatment on mathematics performance was significant but smaller than in literacy (see **Exhibit 21**). The difference between treatment and control was larger in Class 2 than in Class 1, and was most notable in the gaps associated with missing number and subtraction level 2. The achievement levels for both groups were relatively consistent in math, with treatment pupils' results approaching 80% of the achievement level needed for the benchmark on most tasks, except for subtraction fluency and subtraction level 2. This shows that the most difficult skill was also the one with the most significant difference between control and treatment.

Exhibit 21. Math, Class 2: PRIMR and control groups, mean scores and benchmarks, for each subtask



Improvements and Growth Compared to PRIMR Expectations

Using the KNEC fluency standards as a gauge, the PRIMR initiative improved the fluency as well as comprehension of pupils in the intervention schools to more than anticipated levels. At the beginning of the program, stakeholders had projected a percentage growth in fluency levels of 10% by midterm and 20% by the endline. However, as indicated in the previous subsection and in **Exhibit 22**, by midterm, fluencies were three times those at baseline.

Similarly, PRIMR witnessed an unprecedented improvement in basic math scores (measured in terms of addition and subtraction sums pupils were able to answer correctly in a period of one minute). As noted earlier, the data analysts had calculated that PRIMR treatment pupils would reach a modest benchmark level of 8 capm/cspm for Class 1 and a slightly higher one of 12 capm/cspm for Class 2.

Improvements in math scores from baseline to endline are included alongside those for literacy in Exhibit 22.

Exhibit 22. Trend in literacy and numeracy scores

Literacy				Numeracy			
English fluency	Baseline	Midterm	Endline	Basic addition	Baseline	Midterm	Endline
Class 1				Class 1			
(% pupils reading at least 30 cwpm)	6.3	45.0	47.6	(% pupils scoring at least 8 capm)	12	43.5	53.2
Class 2				Class 2			
(% pupils reading at least 65 cwpm)	8.6	29.5	43.7	(% pupils scoring at least 12 capm)	13.3	41.6	61.1
Kiswahili fluency				Basic subtraction			
Class 1				Class 1			
(% pupils reading at least 17 cwpm)	9.9	55.8	55.6	(% pupils scoring at least 8 cspm)	3.8	15.9	29.4
Class 2				Class 2			
(% pupils reading at least 45 cwpm)	5.8	27.1	24.5	(% pupils scoring at least 12 cspm)	2.9	7.4	27.4

Research Question 2: How does the impact of an instructional improvement initiative differ by urban and rural location?

The variation in performance by urban/rural stratification was more evident on the ICT impact evaluation than in the general results. The intervention design ensured that this urban and rural comparison could be tested, and that any differences in outcome by type of zone could be determined.

The findings revealed that in control schools, there was a larger increase in literacy outcomes in peri-urban zones compared to rural zones between January and October 2013. This was to be expected. Interestingly, the analysis also showed that the causal impact of the

PRIMR Kisumu ICT intervention in English was somewhat larger in rural schools than in peri-urban ones. Pupils in peri-urban schools recorded an improvement of 19.7 cwpm in oral reading fluency in English compared to their rural counterparts, whose fluency improved by 12.1 cwpm (**Exhibit 23**). However, an improved fluency of 9.7 cwpm was observed in rural schools as a result of treatment, compared to a 3.2 cwpm improvement that was observed for peri-urban schools. This shows that the peri-urban schools were not driving the PRIMR ICT impact in English and that, in fact, the PRIMR ICT interventions were lessening the rural disadvantage. A similar trend was observed for Kiswahili.

Exhibit 23. ICT gain over baseline English literacy outcomes, by urbanicity

Subtasks	Rural			Peri-urban		
	Gain in control schools	Additional PRIMR gain over control	Overall gain	Gain in control schools	Additional PRIMR gain over control	Overall gain
Letter fluency	10.1	32.2	42.3	14.4	27.8	42.2
Decoding fluency	7.1	9.1	16.2	10.4	4.7	15.1
Oral reading fluency	12.1	9.7	21.8	19.7	3.2	22.9
Reading comprehension	0.4	1.5	1.9	0.0	6.0	6.0
Listening comprehension	3.2	3.2	6.4	10.8	3.2	14.0
Pupils reading at benchmark level	20.7	22.1	42.8	35.2	5.0	40.2

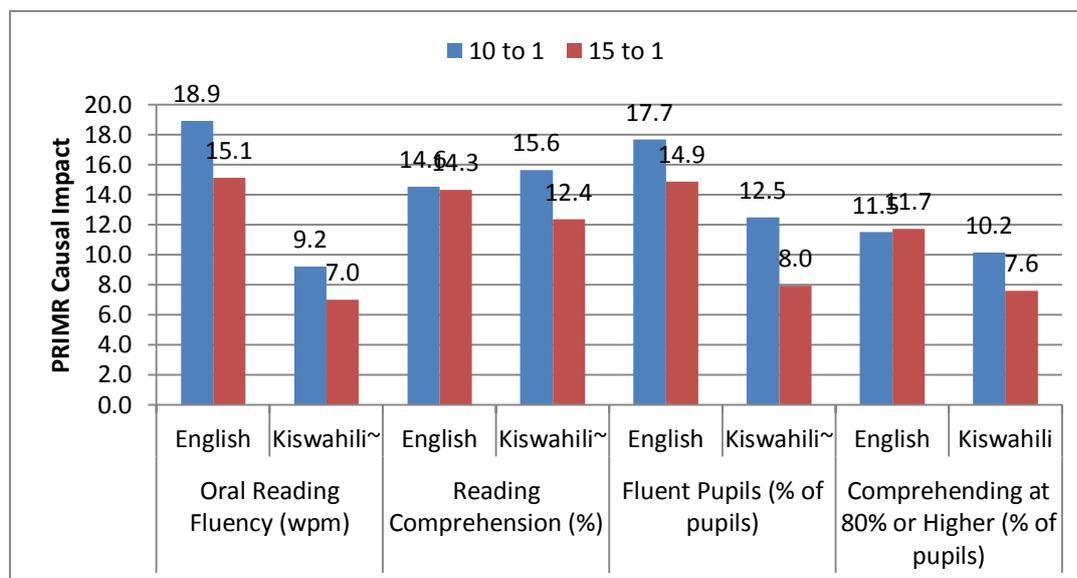
Research Question 3: What ratio of instructional coaches or Teacher Advisory Center (TAC) Tutors is most effective and most cost efficient?

The PRIMR endline results lent credence to the view that TAC Tutors in Kenya with large zones were less likely to make a significant impact on pupil outcomes than those with smaller zones. Given the flexibility and importance of the TAC Tutor program in Kenya, and the relatively large effect size of the differences PRIMR found in formal schools vs. LCPSs, it appears that increasing the TAC Tutor workforce to reduce the ratio of schools to 1:10 might be an effective investment in Kenya, though it is unlikely to be cost-effective in the short term. Currently, the TSC is currently considering this sort of change. Below is the data analysis that led to this conclusion.

The PRIMR research design made it feasible to compare whether there were statistically significant differences in the magnitude of the PRIMR causal effect for key variables in PRIMR between pupils in clusters with 10 schools and those in clusters of 15 schools. **Exhibit 24** shows the causal gains (not the mean scores). It also indicates where the differences between the effect for 10:1 and the effect for 15:1 were statistically significantly different. None of the assessments showed statistical significance at the .05 level, although three of the assessments were significant at the .10 level (signified by a ~). All three of the areas that had a differential impact at the .10 level were in Kiswahili, namely oral reading fluency (effect size 0.102 SD), reading comprehension percentage score (effect size 0.095 SD), and the proportion of pupils reading at the KNEC benchmark (effect size 0.095 SD). There were no statistically significant differences in the impact of 10:1 and 15:1 clusters for the English

outcome variables. This suggests that, in the short term, keeping the 15:1 ratio is more cost-effective, though impacts are likely larger in the 10:1 ratio.

Exhibit 24. PRIMR causal impacts over control for 10:1 clusters and 15:1 clusters



“~” denotes statistically significant difference between 10:1 and 15:1 clusters.

Using the same set of outcome variables, the analysts fit additional regression models within the sample of public schools using the number of schools in the zone as the predictor variable against the key variables of interest for the PRIMR Initiative. While the size of the zone was not randomly assigned, this analysis made it possible to determine whether the directionality was similar to what had been expected and what the data from the randomized controlled trial suggested. **Exhibit 25** presents the findings.

The zone size was a statistically significant predictor of English oral reading fluency in Class 1 (p -value .07) and Class 2 (p -value .07), of Kiswahili oral reading fluency in Class 2 (p -value .03), of English comprehension in Class 2 (p -value .06), of Kiswahili comprehension in Class 2 (p -value .04), of the proportion of pupils reading at benchmark in English in Class 1 (p -value .02), of the proportion reading at benchmark in Kiswahili in Class 1 (p -value .02), and of the proportion of pupils reading at benchmark in Kiswahili in Class 2 (p -value .02). The magnitude of the relationship was nontrivial. For example, in English Class 2, the difference in oral reading fluency was 0.9 cwpm per additional school. For situations like the LCPSs, where the difference was 5 schools between the 10:1 and 15:1 schools, this suggests a 4.5 cwpm gap as a result of zone size. For comprehension, the magnitude of the effect was similar. For Kiswahili Class 2 comprehension percent score, the difference in comprehension rates associated with 5 more schools in a zone was 4.6%. It is worth noting that several of the models showed no statistically significant difference.

Exhibit 25. Number of schools in zone as predictor variable

Item	Language	Class	Coefficient	T	p-value	R ²
Oral reading fluency (cwpm)	English	1	-0.66 (0.36)	-1.82	.074~	.009
		2	-0.91 (0.50)	0.50	.073~	.008
	Kiswahili	1	0.10 (0.29)	0.34	.734	.000
		2	-0.73 (0.32)	-2.26	.028*	.014
Reading comprehension (% correct)	English	1	-0.07 (0.30)	-0.24	.812	.000
		2	-0.85 (0.44)	-1.92	.060~	.008
	Kiswahili	1	-0.30 (0.37)	-0.80	.425	.003
		2	-0.92 (0.44)	-2.07	.042*	.012
Fluent reader (% of population)	English	1	-0.81 (0.34)	-2.36	.022*	.012
		2	-0.40 (0.56)	-0.70	.484	.001
	Kiswahili	1	0.39 (0.30)	1.30	.198	.004
		2	-1.17 (0.50)	-2.34	.022*	.011
Comprehending 80% or higher (% of population)	English	1	-0.10 (0.18)	-0.48	.630	.000
		2	-0.54 (0.47)	-1.15	.257	.002
	Kiswahili	1	0.20 (0.25)	0.80	.429	.002
		2	-1.06 (0.51)	-2.08	.041*	.009

“~” denotes statistically significant difference between 10:1 and 15:1 clusters.

*p < 0.05.

Research Question 4: How does the impact of the initiative differ by formal or low-cost private school status?

Even though there were some subtle differences in performance by type of school at endline, a more revealing difference was observed during the midterm assessment.

Exhibit 26 shows that for almost all tasks measured, LCPSs performed better than public schools. This difference was statistically significant.

Exhibit 26. Impact of PRIMR treatment, English and Kiswahili, disaggregated by school type, by midterm

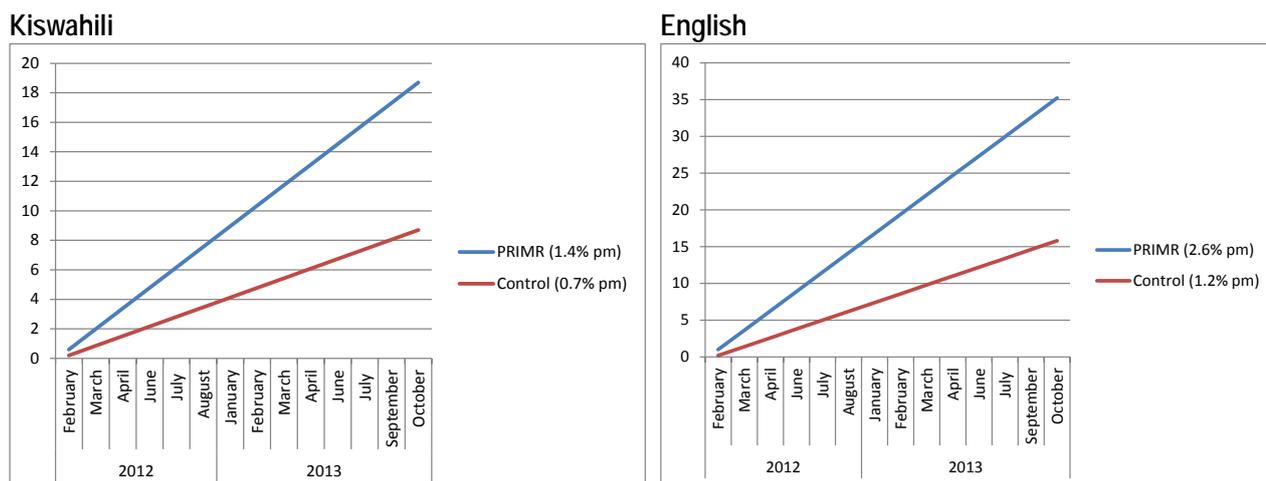
Subtask	Language	Metric	School type	
			Formal	LCPS
Letter-sound fluency	English	clpm	12.9***	31.6***
	Kiswahili	clpm	15.5***	26.4***
Nonword decoding fluency	English	cwpm	1.8	9.6***
	Kiswahili	cwpm	1.1	6.6***
Connected-text fluency	English	cwpm	5.7~	15.4***
	Kiswahili	cwpm	2.2	12.0***
Reading comprehension	English	%	-1.1	5.9*
	Kiswahili	%	3.8~	11.0***
Listening comprehension	Kiswahili	%	10.6**	-4.1
Proportion of fluent readers	English	%	8.8**	16.0***
	Kiswahili	%	7.9**	17.0***

clpm = correct letters per minute
 cwpm = correct words per minute
 ~ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Research Question 5: What duration of initial investment is required to successfully improve student outcomes?

Impact assessment allowed PRIMR to measure the rate of improvement in reading outcomes. **Exhibit 27**, for example, shows how the PRIMR Initiative had improved outcomes in a systematic way as of the endline. The exhibit shows, for both English and Kiswahili, the inferred rate of monthly increase in the proportion of pupils able to read at the MoEST benchmark. In Kiswahili, the rate of increase over the life of PRIMR (the 2012 and 2013 academic years) was 1.4% per month for treatment and 0.7% for control. Given that the percentage of pupils reading at benchmark was very similar (in Class 1) for these Class 2 pupils, this means a very dramatic shift in the proportion of readers in Kiswahili. The results were similar in English, though slightly more stark, as the percentage gain per month was 2.6% for PRIMR and 1.2% for control. Under the control condition, the rate of increase was simply much too slow to ensure that these Kenyan learners could become significantly more literate. This result also indirectly shows that the duration of an intervention really matters. Projection of these results for the treatment pupils shows that the intervention should be undertaken for more than two years in order to reach the desired benchmark level.

Exhibit 27. Rate of increase in the proportion of pupils reading at KNEC benchmark: Kiswahili and English, Class 2



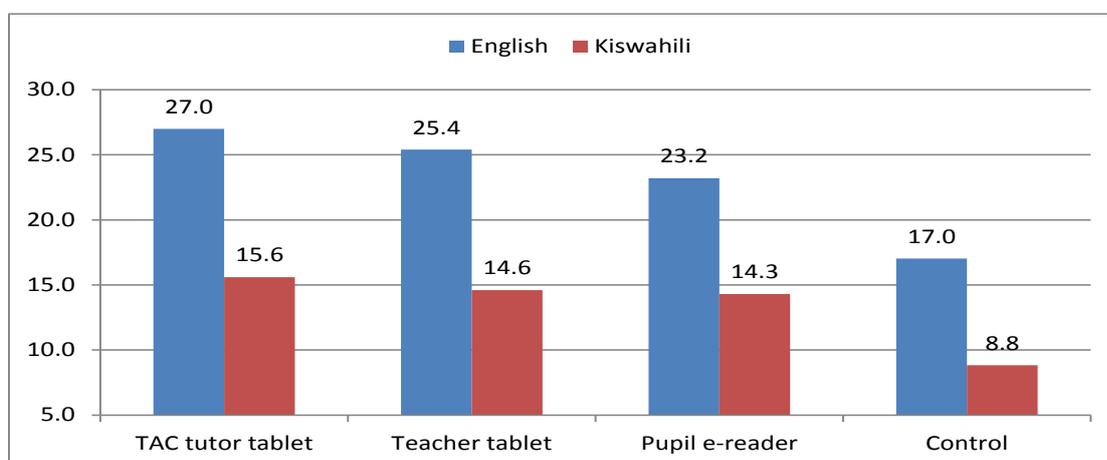
Research Question 6: Are information and communication technology (ICT) interventions more effective than more traditional approaches? Do they add value to traditional methods? Are they cost-effective?

Summary of ICT Intervention Results

Regarding the ICT Kisumu study, pupils in all three treatment groups scored significantly higher statistically on key outcomes compared to pupils in the control group. Although all three treatment groups showed large impacts on achievement, there were no statistically significant differences in the magnitude of the impact among the three treatment groups.

Exhibit 28 presents the gain over the baseline scores in oral reading fluency (correct words per minute) for the three treatment groups and the control groups. Note that the results of all three PRIMR treatment groups showed much higher gains than the controls, in both English and Kiswahili.

Exhibit 28. Gain over baseline in oral reading fluency for the three ICT groups and control groups (in cwpm)



ICT Cost Measurement and Analysis

To measure the cost effectiveness of the three ICT treatments, the PRIMR analysts computed the unit costs per pupil. The basic costs comprised the sum total of pupil books, teachers' guides, teacher training, classroom observations, and TAC Tutor and coach training for the PRIMR core model. The basic cost of the PRIMR core model translated to US\$2.28 per subject per pupil, which was slightly less than the costs for the control group.

The ICT cost per pupil depended on the treatment group and at what level ICT was placed in the treatment. For example, the e-reader cost was applied at the pupil level while the cost of the TAC Tutor tablet was split across the many public schools in the zone and the pupils in each school. Per pupil, the e-readers cost US\$40, the teacher tablet US\$3, and the TAC Tutor tablet US\$0.10.

Given that the impact of the three treatment groups on learning outcomes was similar, the per-pupil cost of ICT made a significant difference in the cost-effectiveness analysis. This is shown in **Exhibit 29**, which presents the oral reading fluency gains over the baseline results per dollar spent. Cost-effectiveness mattered a great deal in this study. The TAC Tutor tablet program was nearly two times more cost effective than either the teacher tablet or control groups, and 10 times more cost effective than the pupil e-reader group. The teacher tablet program was somewhat more cost effective than the control group, but not substantially so. The pupil e-reader group was six times less cost-effective than the control condition. The key message is that while PRIMR's ICT programs were all effective, the per-pupil costs of each treatment were remarkably different. The effect size mattered, but cost mattered more.

Exhibit 29. Oral reading fluency gains over baseline per US dollar spent

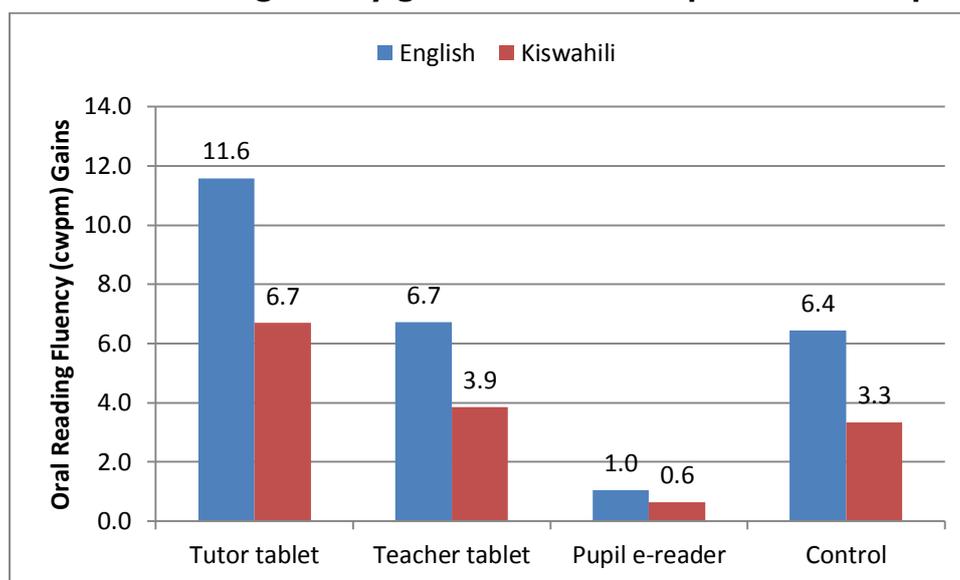
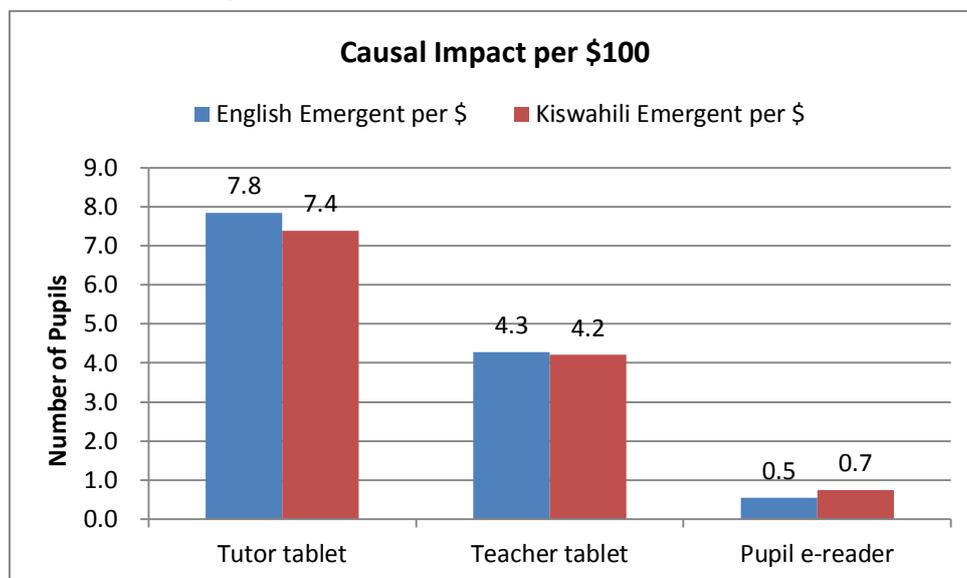


Exhibit 30 presents cost-effectiveness another way. It shows the causal impact of the three treatment groups against the number of pupils who would read at the MoEST's emergent benchmark for US\$100 spent, inclusive of all relevant costs. It shows that the TAC Tutor

tablet program was nearly twice as cost-effective as the teacher tablet program, and the TAC Tutor tablet program was nearly 15 times as cost-effective as the e-reader program.

Exhibit 30. Increase in numbers of pupils at emergent reader benchmark per US\$100 spent



6.7 PRIMR's Impact on MoEST Capacity

Summarizing from earlier sections, PRIMR's impact on the MoEST was as follows:

- The PDIT turned out to be a key avenue for engagement with the MoEST and SAGAs. The involvement of the PDIT in all project activities directly built the capacity of MoEST in implementing wide-scale actions aimed at improving literacy and numeracy outcomes. Members of the PDIT are utilizing their skills in the design and eventual implementation of the forthcoming *Tusome* project and the GPE mathematics program.
- Recommendations from the Kisumu ICT study pointed to effective and cost-effective ICT options that could be used in aiding teaching and learning. These recommendations were adopted by the MoEST and other donor organizations in the form of the National Tablets Programme.
- PRIMR also significantly contributed to formulation of MoEST laws, regulations, and policies geared toward improving literacy and numeracy at the early grade levels. These included the NESP, the Education Act, and the Sessional Paper No. 14 of 2013. PRIMR's analyses and recommendations for policies on school textbooks, low-cost private primary schools, and pre-service primary teacher education and teacher colleges will continue to shape policy on early grade reading and numeracy.
- PRIMR also provided technical support to KNEC in developing and reviewing additional research instruments (on literacy and numeracy). These instruments will be used in the GPE grant and in KNEC's internal assessments.

7. Additional Activities

7.1 DFID-Supported PRIMR Rural Expansion Programme

Due to the early success of the USAID PRIMR Initiative, DFID decided to support an expansion of the PRIMR Initiative into two rural counties in Kenya. The purpose of the expansion was to test the success of the PRIMR model in rural communities before a possible national scale-up, and to answer questions the MoEST had raised concerning the necessity of the fully scripted lesson plans in use in the USAID PRIMR schools, and the use of the instructional approach for mother tongue. Thus, a study was designed to better examine the impact of the daily lesson plans and mother-tongue-based instruction on student outcomes.

The DFID Rural Expansion Programme began in April 2012 in Machakos and Bungoma counties and will continue through February 2015. It consists of four treatment groups to test the impact of various level of materials given to teachers:

1. **Full PRIMR** – This group is receiving the same model as the USAID PRIMR schools, including lesson plans, pupil books, teacher training, and in-class support from coaches.
2. **Books & Training** – This group received pupil books, teacher training, and in-class support from coaches, but no lesson plans. The training this group received focused on the best practices of reading and math instruction and included sessions on writing lesson plans using the PRIMR approach to instruction and the PRIMR pupil books. This group will help MoEST to learn whether the pupil book alone is sufficient to improve student outcomes.
3. **Training Only** – The Training Only group received no pupil books or lesson plans, but did receive training and support by TAC Tutors. This group also received the same best-practices training, with sessions on how to write lesson plans based on the PRIMR approach and the current Kenyan pupil books. This group will allow the MoEST to see the impact of training and support alone to help teachers improve instruction.
4. **Full PRIMR + Mother Tongue** – The final group received the Full PRIMR model plus mother-tongue PRIMR instructional materials. These materials were developed in the Lubukusu and Kikamba languages. This group will help the MoEST to see the effect of mother tongue on the teaching of reading skills. Although the government's policy states that students are to be taught in mother tongue through Class 3, PRIMR found through its research that for a number of reasons, most instruction was taking place in English or Kiswahili. This group will help MoEST make decisions about how to implement the language policy.

Results of the DFID study were not yet final at the completion of this USAID report; however, the midterm results showed that the Full PRIMR program had the largest impact on learning outcomes. The Books & Training and Training Only treatment groups had an effect that was not distinguishable from zero. The Full PRIMR + Mother Tongue program had not been implemented at the time of the midterm evaluation.

7.2 DFID-Supported National Tablets Programme

DFID also partnered with PRIMR in beginning a National Tablets Programme in March 2014 to equip every TAC Tutor in Kenya with the skills to use Nexus 7 tablets to improve instruction, as had been successfully tested under one component of the USAID program. Tablets were loaded with pupils' activity books, teachers' guides, various types of instructional software, lesson observation tools, high-quality instructional videos, and game and e-book applications. This section briefly describes the scope and progress of the DFID-sponsored activities.



MoEST Education Cabinet Secretary, Professor Jacob Kaimenyi (center), tests the cloud-based lesson observation tool on a tablet as DFID-Kenya's Dr. Joanne Abbot (right) and PRIMR Chief of Party Dr. Benjamin Piper (left) look on.

RTI International received 1,270 Google Nexus 7 tablets as a donation from a private company, enough to be distributed to each TAC Tutor in the country. The zones that were already implementing PRIMR were issued with tablets as part of the January 2014 training. Parts of this batch of tablets were issued to TAC Tutors in PRIMR intervention zones for use during the TAC Tutor training in January 2014. In March 2014, RTI held a successful launch of the National Tablets Programme. Among the 62 attendees were the Cabinet Secretary and senior education officers of the MoEST, the DFID/Kenya Deputy Head of Office and various staff, representatives from the SAGAs, other stakeholders, and RTI International staff led by the PRIMR Chief of Party, Dr. Piper. This launch was followed by a national training of all TAC Tutors in Kenya, culminating in all TAC Tutors in Kenya having a Google Nexus 7 tablet for their use in daily lesson observation.

Like the Kisumu ICT study tablets, these tablets were loaded with the following applications and capabilities:

1. **Cloud-based lesson observation tool.** This tool is used during classroom observation and integrates teachers' guides so that the TAC Tutor can follow the lesson with the teacher. The teachers' guides, however, are available only for TAC Tutors in the Full PRIMR and Full PRIMR + Mother Tongue zones. The tool has assessment questions relevant to each week's lesson, and TAC Tutors are required to randomly assess three pupils, the results which are computed to determine the fluency of the pupils. Based on the responses given by the TAC Tutor to the observation questions, the software provides structured feedback on areas in which the teacher needs to improve. Additionally, this tool allows the collection of GPS coordinates of the school location, allowing the MoEST and PRIMR to visually map out all the intervention schools.



Cabinet secretary for Education Professor Kaimenyi (R) is shown how a tablet works by Dr. Piper (PRIMR) and Dr. Abbot (DFID/Kenya)



Cabinet Secretary for Education Professor Kaimenyi and Dr. Piper at the National Tablets Programme launch

2. **Instructional videos.** These high-quality videos model instruction in English, Kiswahili, and math. They are used as a feedback mechanism to demonstrate to teachers how to carry out instruction on lesson segments in which they are having difficulties.
3. **E-versions of pupils' books and teachers' guides.** The books have multimedia resources built in, which help teachers improve lesson delivery by virtue of embedded audio files for each lesson component.
4. **Papaya software.** Sound recognition has been noted as an area that most teachers struggle with. This application provides reference to a collection of recorded letter sounds in English and Kiswahili, in an easy-to-use interface. TAC Tutors use this application to teach teachers correct letter sounds in English and Kiswahili.
5. **Game and e-book applications.** These animated games and e-books can be loaded onto any device and provide instructional content that is fun and interactive for pupils. Examples are sound-recognition games, words spelling and pronunciation games, and comprehension games. Like the instructional videos, the TAC Tutors use these applications to show teachers how to teach sections with which they are struggling.

8. PRIMR April–June 2014 Quarterly Progress Report

As noted in the Introduction, USAID requested that the final report for the PRIMR Initiative incorporate a progress report on activities and accomplishments for the period April–June 2014. During this last quarter before closeout, PRIMR's support focused on training, supervision and classroom support for teachers, community activities such as reading and math exhibitions, and monthly reflection meetings—all standard practices in each year of the intervention. The subsections that follow present relevant details for the final reporting period.

8.1 Training of TAC Tutors and Coaches

The coaches' training was held April 23–25, 2014, and TAC Tutors' training April 29–30. The two trainings were held at PRIMR's offices. These were "curtain raisers" for the series of trainings which were to follow. The training focused on three main topical areas: (1) implementation of the PRIMR instructional approach "I do / We do / You do"; (2) activities to carry out before, during, and after reading, to promote comprehension; and (3) incorporation of three math concepts into every lesson, and the strategies used to teach them. The trainings were also aimed at equipping the TAC Tutors and coaches to support the teacher trainings that were to follow. The trained coaches and the TAC Tutors were also given the mandate of co-facilitating identical training workshops at both their clusters and other clusters or zones.

8.2 Training of Teachers and Head Teachers

The PRIMR Initiative considers continuing professional development of teachers to be a key strategy for improving teachers' instructional competence and ultimately children's literacy and numeracy learning outcomes. Whereas typical professional development programs in Kenya are designed to pass along knowledge and skills in a lecture format, PRIMR's training gives



Teacher training, May 2014

teachers a lot of practice on how to implement improved instruction. Concepts are introduced, modeled, and then followed by a cycle of guided and independent practice by the participants themselves.

During this quarter, teachers from all PRIMR targeted zones and counties were taken through a two-day training as part of their continuous professional development. A total of five counties and their 40 zones or clusters (in the case of LCPSs) benefited (see **Exhibit 31**). A total of 1,593 (421 male and 1,172 female) teachers were trained.

The objectives of the trainings were to: improve teachers' knowledge about the PRIMR implementation approach; enhance teachers' reading comprehension instructional skills; and enhance teachers' math instructional skills. Alongside the teacher training, PRIMR offered head teacher sensitization training, which was more of a reflection session to establish what worked well and what did not go well during the PRIMR implementation.

Exhibit 31. Summary participant data, by zone/cluster and county

No.	Zone/Cluster	County	Gender		Total
			Male	Female	
1.	Madaraka Zone	Kiambu	8	25	33
2.	Thika West – Juja Zone	Kiambu	14	60	74
3.	Ahero Zone	Kisumu	41	53	94
4.	Barkorwa Zone	Kisumu	23	18	41

No.	Zone/Cluster	County	Gender		Total
			Male	Female	
5.	Bolo Zone	Kisumu	18	18	36
6.	Chulaimbo Zone	Kisumu	12	28	40
7.	Kodingo Zone	Kisumu	22	20	42
8.	Nyabondo Zone	Kisumu	21	30	51
9.	Otonglo Zone	Kisumu	13	35	48
10.	Ragumo Zone	Kisumu	11	44	55
11.	Ithanga Zone	Murang'a	20	19	39
12.	Baba Dogo Cluster	Nairobi	7	18	25
13.	Chokaa Cluster	Nairobi	2	21	23
14.	Congo Cluster	Nairobi	12	26	38
15.	Dandora Zone	Nairobi	9	66	75
16.	Gatwekira Cluster	Nairobi	5	13	18
17.	Gichagi Cluster	Nairobi	4	21	25
18.	Juja Road Zone	Nairobi	3	57	60
19.	Kariobangi Mowlem Cluster	Nairobi	4	12	16
20.	Kariobangi North Cluster	Nairobi	5	38	43
21.	Kayole Cluster	Nairobi	10	36	46
22.	Kianda Cluster	Nairobi	9	18	27
23.	Korogocho Cluster	Nairobi	6	21	27
24.	Makina Cluster	Nairobi	7	16	23
25.	Matopeni Cluster	Nairobi	5	30	35
26.	Nairobi West Zone	Nairobi	2	33	35
27.	Ngando Cluster	Nairobi	3	12	15
28.	Posta Cluster	Nairobi	4	17	21
29.	Riruta Cluster	Nairobi	4	12	16
30.	Riruta Zone	Nairobi	4	45	49
31.	Silanga Cluster	Nairobi	3	19	22
32.	Soweto Cluster	Nairobi	6	24	30
33.	Viwanda Zone	Nairobi	1	28	29
34.	Waruku Cluster	Nairobi	12	18	30
35.	Zimmerman Cluster	Nairobi	2	22	24
36.	Kampi ya Moto Zone	Nakuru	21	49	70
37.	Lare Zone	Nakuru	30	30	60
38.	Mauche Zone	Nakuru	20	26	46
39.	Nakuru Central Zone	Nakuru	5	42	47
40.	Nakuru Eastern Zone	Nakuru	13	52	65
	Total		421	1,172	1,593

8.3 Supportive Supervision of Teachers by TAC Tutors and Coaches

Teachers in Kenya often find themselves teaching alone without anyone to tell them how well they are teaching. Many teachers lack support regarding whether they are teaching the “right” way, why the children are not understanding certain concepts, or even why some lessons are difficult to teach. These are issues that can be resolved only when a technical specialist is present to advise on the best pedagogical methodologies and to model the best approaches for the teacher to learn from.

The PRIMR Initiative continued to provide such opportunities through TAC Tutors and coaches. The role of the TAC Tutor/coach is to be an advisor to the teacher. Through the instructional support supervision approach, as in previous quarters, the coaches/TAC Tutors visited teachers and observed them teaching. Once the teachers finished, the coach/TAC Tutor engaged the teachers in a reflective session during which they both interactively shared feedback on the lesson.

This support format was further enhanced through the PRIMR Initiative’s technical team members, who made routine visits to the schools to accompany the coaches and TAC Tutors, with the aim of strengthening their support. As is standard, TAC Tutors and coaches were helped to realize that their role is not to control but to support. The approach has proven effective in mentoring teachers to be better instructional leaders.

Exhibit 32 shows the number of visits made per county during the quarter under review.

Exhibit 32. Number of classroom visits, April–June 2014

County	Month			Total
	April	May	June	
Nairobi	12	543	779	1334
Kisumu	9	259	0	268
Nakuru	0	90	48	138
Kiambu	0	15	65	80

8.4 Reading and Math Exhibitions

During the period under review, reading exhibition activities were organized specifically to enhance community participation in the PRIMR Initiative. Parents became increasingly



Parents listening to the teacher as she instructs them during the reading and math exhibition in Ithanga Zone.

involved in all the reading exhibitions across the different zones and clusters. Several remarked on the great changes in reading outcomes among their children, especially in sound pronunciation, and commented that very soon there will be no nonreaders in the schools across the PRIMR targeted areas. Twenty-six reading and math exhibitions were held across the various zones and clusters.

8.5 Cluster Reflection Meetings for Teachers

During the quarter under review, 34 monthly cluster reflection meetings were conducted across the PRIMR clusters and zones. Reports from these reflection meetings consistently showed that teachers who were applying the PRIMR methodology faithfully were observing great improvements in both reading and numeracy outcomes among their pupils. Such teachers reported that the approach honed the pupils' reading skills; that tracking with a finger while reading helped learners to concentrate and read with comprehension; and that the approach catered to learners of different abilities.

Peer-to-peer interactions among teachers at the meetings also helped them enhance their content mastery and delivery. They commended the "I do / We do / You do" approach for helping learners grasp a new skill taught in class with ease. And as expressed by a teacher during the Lare zonal cluster meeting, "pupils enjoy reading in PRIMR [more] than other methods; in PRIMR there is no pupil who is stupid....." The teachers also confirmed that pupils' ability to express themselves was now evidenced during sentence construction and prediction. It was also reported that teachers' lesson-delivery skills had improved.

8.6 Monthly Reflection Meetings for TAC Tutors and Coaches

During the quarter in review, the project conducted one reflection meeting with the TAC Tutors and coaches. The meeting attendees discussed, among other things, the Term 2 teacher training, ways to improve classroom implementation of PRIMR, and methods to ensure full observation.

9. Lessons Learned and Recommendations

9.1 Lessons Learned

This section presents key lessons learned from PRIMR in a variety of key areas focused on quality improvement in Kenya's primary schools.

1. **Training for TAC Tutors:** As the assessment results showed, TAC Tutors' visits to schools were critical for supporting teachers and improving pupil's outcomes. Proper training of TAC Tutors is essential so that they can effectively support teachers. The results also indicated that schools visited frequently were likely to have stronger pupil performance; hence, TAC Tutors should focus on making frequent and consistent classroom observations, even in the face of their heavy workload.
2. **Travel reimbursement structures:** PRIMR successfully facilitated TAC Tutors' classroom visits. This involved a modest reimbursement that incentivized TAC Tutors to visit classrooms consistently. The method that was most successful reimbursed TAC Tutors against the proportion of teachers from whom they successfully uploaded classroom observational data on a monthly basis.
3. **Teacher training:** Training of teachers is a complex task that must assume that teachers are adult learners who learn best by doing and interacting with other professionals. This implies that teacher training should be organized around modeling

and practice, and that having brief trainings with follow-up and refresher meetings is more effective than longer trainings. The PRIMR training models improved when a “mastery checklist” was instituted, which provided a focus and a target for teachers to use when being trained.

4. **Distribution of classroom materials:** Distribution of materials to schools is a complex task. It requires accurate school enrollment data, prior planning, and a sophisticated distribution network. Ensuring that materials reach the schools on time was an essential PRIMR task. The PRIMR program showed that data can be collected from schools consistently. We hope that UNICEF school mapping data that became available in 2014 can be used to implement a high-quality mapping program to help the distribution process.
5. **Priorities in the school calendar:** During the implementation of PRIMR, it became apparent that at certain times of the academic year, the TAC Tutors had to spend significant time away from the classroom. This occurred primarily during extracurricular activity periods. These are clearly important for a balanced learning experience for pupils, but better understanding of how these extracurricular activities could be organized so that they do not impede the TAC Tutors’ ability to support instruction is important.
6. **In-service training:** During PRIMR assessments and implementation, the evidence suggested that most of the teachers supported by PRIMR had not attended professional development courses or in-service courses for several years since leaving college or becoming teachers. The PRIMR Initiative’s regular professional development through training and other activities filled a demand for increased instructional practice and support. Collaboration between TSC and the MoEST is essential for this to happen successfully.
7. **Changes in instructional approaches:** Old habits take time to change, and the shift from traditional teaching to more active, sequenced, pupil-focused approaches was the central focus of PRIMR. Some teachers continued to use the two approaches concurrently at the beginning of PRIMR, in part because of concern about whether the lessons properly covered the material that would appear in the national end-of-year examinations. Advocacy was needed to change the mindset of some teachers.
8. **Instructional change takes time:** Any scale-up of PRIMR or other methods should recognize that large-scale instructional improvements are difficult. They require face to face time, practice, and ongoing feedback. The programs should be structured to allow for that.
9. **Incentives and choice matter.** Large-scale instructional improvement is expensive, so the incentives included should not necessarily be monetary. But programs that introduce choice and competition as a prerequisite for participation are more likely to have teachers implementing consistently, and to see the program as something that they have ownership and control over. This is essential for them to implement it well.

10. **Understanding costs is essential.** The ICT program in Kisumu County showed that while effectiveness is possible, costs matter more. Without taking into account the cost of interventions, poor policy decisions are likely. Similarly, in the area of books, the PRIMR program showed that book costs are significantly higher in Kenya than they should be. Active policy advocacy is necessary to ensure that pupils get high-quality materials for low cost.
11. **Materials revision should be built in.** PRIMR's materials were significantly better in 2014 than they were in 2012. Kenya's scale-up of PRIMR will benefit because PRIMR had sufficient time to innovate, improve and change. This is essential part of the design of successful programs.

9.2 Recommendations

The following recommendations come from the endline assessment as well as an overall evaluation of PRIMR implementation. Some of them are specific to Kenya at the policy level, and others are relevant for the *Tusome* literacy scale-up or the GPE mathematics scale-up.

1. **Results and scale-up:** PRIMR's results showed remarkable improvements in pupils' literacy and numeracy abilities, especially for pupils starting at the lowest levels of literacy and numeracy. The MoEST should therefore consider scaling up PRIMR activities to improve the quality of instruction in Classes 1 and 2 in the *Tusome* program.
2. **Careful scale-up:** While the PRIMR findings lead to optimism that the *Tusome* program is built on a successful policy and materials base, utilizing care in the design of *Tusome* is a key recommendation. Building on the incentives, the interest and the concern that each county has in improving the quality of education might suggest that a staggered implementation would lead to higher quality educational outcomes.
3. **Girls' performance:** The results indicated that, overall, girls were performing at the same level as—if not better than—boys, especially in literacy. Teachers should be trained in strategies for motivating girls so that they remain competitive as they move to upper primary.
4. **Zonal size:** The results showed that TAC Tutors in large zones were less likely to have a significant an impact on pupil outcomes than those in smaller zones. Considerations should be made to limit the number of schools that the TAC Tutors are responsible for. This would make TAC tutors more effective in supporting teachers frequently.
5. **Textbook ratio:** Provision of books to pupils at a 1:1 ratio is paramount in improving pupils' literacy and numeracy. The PRIMR analysis suggested that the government's current allocation would be enough to have a 1:1 ratio of books for all pupils in Kenya at low cost, if the cost of the books was more competitive.
6. **Advocacy and uptake:** There should be advocacy of PRIMR's success through sharing of research results with a wider circle of stakeholders, including the MoEST and SAGAs.

7. **Language of instruction:** The language of instruction remains a complex issue for the Kenyan education system. Any attempt to scale up PRIMR activities without resolving this issue is likely to increase complexity during the implementation. The DFID PRIMR study, which is funding instructional materials and support in two mother tongues, will provide evidence as to the effectiveness of mother tongue compared with a basic instructional support program.
8. **Textbook policies:** The findings on cost and impact suggest a need to consider the guidelines regarding vetting and selection of textbooks for use in schools. The complexity of multilingual literacy and numeracy instruction requires vetting guidelines that are tailored to the instructional characteristics of Kenya's system. In addition, the PRIMR team recommends revising the textbook policy to allow for an evaluation and design process that will lead to higher quality materials produced by publishers in Kenya.
9. **Pre-service reform:** The PRIMR policy study on pre-service reform suggests that the pre-service education and training sector should be reorganized fundamentally. The focus on early literacy and numeracy is lacking, and the mismatch in the curriculum used in the pre-service sector and the KICD school curriculum is exacerbated by the limited experience that pre-service lecturers have with the instructional realities of primary classrooms, particularly in lower primary. This suggests a revision of this subsector to ensure higher quality literacy and numeracy outcomes.
10. **Inclusion of low-cost private schools:** The PRIMR findings showed that the LCPSs in Kenya do contribute to improving the quality of education in Kenya. A PRIMR policy study carried out for the MoEST suggested a range of options to capitalize on the subsector, from a limited-choice model, to a relaxed registration model, and the status quo. PRIMR recommends that the LCPSs be seen as an asset to the Kenyan system, and that they be used to put more pressure on existing schools to produce better learning outcomes for pupils.
11. **Abolish or revise termly examinations.** Most of the schools that PRIMR worked with purchased examinations from printers in Nairobi and other towns. These exams were not closely related to the KICD syllabus, not targeted to the content in the most frequently used books, and emphasized items that were nonessential to successful literacy and numeracy acquisition. Many zones set their own exams, which is commendable. That should be the required practice or a single exam should be set.
12. **Daily literacy and numeracy instruction:** Lesson time could be revised to accommodate more literacy and numeracy instructional time during the week. This is true not only because Kenya's literacy and numeracy allocations are paltry compared to the rest of East Africa, but also because of the evidence that in control schools, pupils spent very little time actually reading texts.
13. **Teacher assignments:** PRIMR advocated that the transfer of teachers trained in its methods should be minimized to avoid the need for repeated onboarding and introductory training on a rolling basis. The TSC worked tirelessly to ensure that

transfers were kept to a minimum, and it is hoped that this type of accommodation can continue in future programming.

14. **ICT for instructional improvement.** PRIMR's findings suggested that the most effective ICT focused on helping teachers improve instruction. This required the target of ICT *not* to be just the hardware, or just the content, but instead the connections among hardware, content, and the instructional core. The advantage to ICT in Kenya is that it can be easily accessible, and it can help the most complicated part of educational reform, which is the interactions among teachers, students and content. Investments targeted thoughtfully at improving that core in simple and manageable ways is important.

Implementing these recommendations would increase the likelihood of PRIMR and any successor program having high levels of uptake by teachers and head teachers, as well as enthusiasm for the program from the County Education offices and TSC offices.

Most critically, the objective ensuring that all pupils are literate and numerate by Class 2 would be realized.

10. Performance Monitoring Plan Results as of July 2014

Exhibit 33 summarizes PRIMR's M&E data through the final quarter of project activity.

Some notes regarding the exhibit:

- Statistics on IR1: *Reading and Comprehension for Class 1 and 2 children improved* and IR 2: *Basic math ability for Class 1 and 2 children improved* were computed based on impact assessment data collected at baseline, midterm, and endline. Further, actual scores captured for the year 2012 were generated from the baseline data collected in January 2012. Scores under the 2013 column were based on analysis of the Cohort 1 data subset as of midterm (October 2012), and scores in the 2014 column were based on the analysis of a data set comprising both Cohort 1 and 2 collected in November 2013.
- Statistics on IR 3: MoEST capacity to implement wide scale actions to improve basic reading and math skills strengthened include data through June 2014.

Exhibit 33. PRIMR Initiative performance against indicators as of July 2014

Intermediate Results	Indicator	Data source	Reporting frequency	Targets					
				Proposed			Actual		
				2012	2013	2014	2012	2013	2014
IR 1: Reading and comprehension for Classes 1 and 2 children improved (English & Kiswahili)	1.A1a: The proportion of learners reading at agreed-upon benchmark of words per minute by grade – English	EGRA database	Annual	TBD	20% over baseline	40% over baseline	Class 1 = 0.5% Class 2 = 8.0%	Class 1 = 12.6% Class 2 = 34%	Class 1 = 16.4% Class 2 = 47.3%
	1.A1a: The proportion of learners reading at agreed-upon benchmark of words per minute by grade – emergent-plus fluency – English	EGRA database	Annual	TBD	20% over baseline	40% over baseline	Class 1 = 6.3% Class 2 = 37.2%	Class = 45.0% Class 2 = 65.0%	Class 1 = 47.6% Class 2 = 78.2%
	1.A2a: The proportion of learners reading at agreed-upon benchmark of words per minute school type – English	EGRA database	Annual	TBD	20% over baseline	40% over baseline	Formal = 4.6% LCPS = 5.3%	Formal = 14.3% LCPS = 40.2%	Formal = 20.1% LCPS = 42.0%

Intermediate Results	Indicator	Data source	Reporting frequency	Targets					
				Proposed			Actual		
				2012	2013	2014	2012	2013	2014
	1.A2a: The proportion of learners reading at agreed-upon benchmark of words per minute school type – English – emergent plus fluency	EGRA database	Annual	TBD	20% over baseline	40% over baseline	Formal = 19.5% LCPS = 27.4%	Formal = 46.3 LCPS = 79.8	Formal = 51.0% LCPS = 81.3%
	1.A3a: The proportion of learners reading at agreed-upon benchmark of words per minute by gender – English	EGRA database	Annual	TBD	20% over baseline	40% over baseline	Female = 6.4% Male = 3.4%	Female = 22.8% Male = 20.8%	Female = 30.2% Male = 26.4%
	1.A3a: The proportion of learners reading at agreed-upon benchmark of words per minute by gender – English – emergent-plus fluency	EGRA database	Annual	TBD	20% over baseline	40% over baseline	Female = 24.1% Male = 20.9%	Female = 59.8% Male = 51.6%	Female = 63.1% Male = 61.0%
	1.A1b: The proportion of learners reading at agreed-upon benchmark of words per minute by grade – Kiswahili	EGRA database	Annual	TBD	20% over baseline	40% over baseline	Class 1 = 0.4% Class 2 = 5.8%	Class = 13.4% Class 2 = 27.1%	Class 1 = 6.9% Class 2 = 24.5%
	1.A1b: The proportion of learners reading at agreed-upon benchmark of words per minute by grade – Kiswahili – emergent-plus fluency	EGRA database	Annual	TBD	20% over baseline	40% over baseline	Class 1 = 9.9% Class 2 = 48.1%	Class = 55.8% Class 2 = 76.7%	Class 1 = 55.6% Class 2 = 80.8%
	1.A2b: The proportion of learners reading at agreed-upon benchmark of words per minute school type – Kiswahili	EGRA database	Annual	TBD	20% over baseline	40% over baseline	Formal = 2.8% LCPS = 4.0%	Formal = 15.0% LCPS = 35.5%	Formal = 11.5% LCPS = 21.9%

Intermediate Results	Indicator	Data source	Reporting frequency	Targets					
				Proposed			Actual		
				2012	2013	2014	2012	2013	2014
	1.A2b: The proportion of learners reading at agreed-upon benchmark of words per minute school type – Kiswahili – emergent-plus fluency	EGRA database	Annual	TBD	20% over baseline	40% over baseline	Formal = 27.0% LCPS = 34.6%	Formal = 60.3% LCPS = 84.1%	Formal = 55.6% LCPS = 80.8%
	1.A3b: The proportion of learners reading at agreed-upon benchmark of words per minute by gender – Kiswahili	EGRA database	Annual	TBD	20% over baseline	40% over baseline	Female = 3.6% Male = 3.0%	Female = 20.8% Male = 20.5%	Female = 15.5% Male = 15.3%
	1.A3b: The proportion of learners reading at agreed-upon benchmark of words per minute by gender – Kiswahili – emergent-plus fluency	EGRA database	Annual	TBD	20% over baseline	40% over baseline	Female = 32.6% Male = 27.3%	Female = 69.2% Male = 64.8%	Female = 69.6% Male = 65.9%
	1.B1a: The proportion of learners comprehending at 80% or higher disaggregated by grade – English	EGRA database	Annual	80% or higher comprehension	20% over baseline	40% over baseline	Class 1 = 0.3% Class 2 = 5.2%	Class 1 = 2.1% Class 2 = 5.3%	Class 1 = 5.9% Class 2 = 23.8%
	1.B2a: The proportion of learners comprehending at 80% or higher disaggregated by school type – English	EGRA database	Annual	80% or higher comprehension	20% over baseline	40% over baseline	Formal = 2.7% LCPS = 3.3%	Formal = 3.5% LCPS = 4.5%	Formal = 9.4% LCPS = 23.2%
	1.B3a: The proportion of learners comprehending at 80% or higher disaggregated by gender – English	EGRA database	Annual	80% or higher comprehension	20% over baseline	40% over baseline	Female = 3.8% Male = 2.0%	Female = 3.9% Male = 3.7%	Female = 14.7% Male = 14.5%

Intermediate Results	Indicator	Data source	Reporting frequency	Targets					
				Proposed			Actual		
				2012	2013	2014	2012	2013	2014
	1.B1b: The proportion of learners comprehending at 80% or higher disaggregated by grade – Kiswahili	EGRA database	Annual	80% or higher comprehension	20% over baseline	40% over baseline	Class 1 = 0.3% Class 2 = 6.9%	Class 1 = 5.7% Class 2 = 13.9%	Class 1 = 5.2% Class 2 = 22.2%
	1.B2b: The proportion of learners comprehending at 80% or higher disaggregated by school type – Kiswahili	EGRA database	Annual	80% or higher comprehension	20% over baseline	40% over baseline	Formal = 3.6% LCPS = 4.0%	Formal = 6.9% LCPS = 9.7%	Formal = 9.7% LCPS = 19.5%
	1.B3b: The proportion of learners comprehending at 80% or higher disaggregated by gender – Kiswahili	EGRA database	Annual	80% or higher comprehension	20% over baseline	40% over baseline	Female = 3.8% Male = 3.8%	Female = 10.2% Male = 9.9%	Female = 12.5% Male = 14.3%
	1.C1a: Proportion of students who, by the end of two grades of primary schooling, demonstrate that they can read and understand the meaning of grade level text disaggregated by school type – English	EGRA database	Annual	Fluent & 80% questions	20% over baseline	40% over baseline	Formal = 3.2% LCPS = 3.9%	Formal = 3.5% LCPS = 7.4%	Formal = 14.2% LCPS = 32.0%
	1.C2b: Proportion of students who, by the end of two grades of primary schooling, demonstrate that they can read and understand the meaning of grade level text disaggregated by gender – English	EGRA database	Annual	Fluent & 80% questions	20% over baseline	40% over baseline	Female = 5.0% Male = 1.8%	Female = 4.6% Male = 4.3%	Female = 22.3% Male = 19.3%
	1.C1a: Proportion of students who, by the end of two grades of primary schooling, demonstrate that they can read and understand the meaning of grade level text disaggregated by school type – Kiswahili	EGRA database	Annual	Fluent & 80% questions	20% over baseline	40% over baseline	Formal = 3.1% LCPS = 4.5%	Formal = 7.1% LCPS = 22.6%	Formal = 11.6% LCPS = 22.3%

Intermediate Results	Indicator	Data source	Reporting frequency	Targets					
				Proposed			Actual		
				2012	2013	2014	2012	2013	2014
	1.C2b: Proportion of students who, by the end of two grades of primary schooling, demonstrate that they can read and understand the meaning of grade level text disaggregated by gender – Kiswahili	EGRA database	Annual	Fluent & 80% questions	20% over baseline	40% over baseline	Female = 4.1% Male = 3.1%	Female = 12.5% Male = 9.7%	Female = 14.3% Male = 16.9%
	1.D: % of observed lessons using lesson plans for reading	Coach/tutor records	Annual	50%	70%	70%	98%	98%	98%
Sub IR 1.1.1: Teachers' pedagogical support strengthened									
	1.1.1 A: % of teachers observed six times or more per year	PRIMR records	Annual	60%	80%	80%	95%	96%	100%
	1.1.1.B: Total number of person-hours of teachers/educators/training assistants who successfully completed in-service training or received intensive coaching or mentoring with U.S. Government (USG) support	PRIMR records	Annual	2400	6080	1600	36,680	36,292	73,120
	1.1.1C: Number of coaches/TAC Tutors trained with USG support	PRIMR records	Annual	12	25	4	19	31	35
	1.1.1D: Number of administrators successfully trained with USG support	PRIMR records	Annual	250	460	170	125	403	547
Sub IR 1.1.2: Curriculum/lesson plans/classroom materials for reading instruction strengthened									
	1.1.2.A: % of observed classrooms with reading materials for children	PRIMR coach/Tutor observation	Annual	70%	85%	85%	98%	98%	98%

Intermediate Results	Indicator	Data source	Reporting frequency	Targets					
				Proposed			Actual		
				2012	2013	2014	2012	2013	2014
	1.1.2.B: Copies of English books and printed reading/learning materials distributed to all PRIMR schools	PRIMR records	Annual	10,000	25,000	6,000	11,580	35,935	57,122
	1.1.2.C: Copies of Kiswahili books and printed reading/learning materials distributed to all PRIMR schools	PRIMR records	Annual	10,000	25,000	6,000	11,580	35,935	57,122
Sub IR 1.1.3 Systematic approach to Kiswahili and English transition in reading improved									
	1.1.3.A: % of schools with improved Kiswahili outcomes on oral reading fluency in Classes 1 and 2	EGRA database aggregated to school level	Annual	0	15%	30%	—	83.8%	83.8%
	1.1.3.B: % of schools with improved English outcomes on oral reading fluency in Classes 1 and 2	EGRA database aggregated to school level	Annual	0	15%	30%	—	83.8%	83.8%
	1.1.3.C: % of schools with improved Kiswahili and English outcomes on oral reading fluency	EGRA database aggregated to school level	Annual	0	10%	20%	—	83.8%	83.8%
Sub IR 1.1.4 Teacher capacity to implement and use periodic student assessments strengthened									
	1.1.4.A: Number of schools participating in reading competitions	PRIMR records	Annual	110	300	100	125	403	547

Intermediate Results	Indicator	Data source	Reporting frequency	Targets					
				Proposed			Actual		
				2012	2013	2014	2012	2013	2014
	1.1.4.B: Number of schools sharing school report cards in reading with community	PRIMR records	Annual	110	300	100	125	403	0
IR 2: Basic math ability for Classes 1 and 2 children improved.	IR 2: Basic math abilities for Classes 1 and 2 children improved								
	2.A1a: % average score of participating learners on mathematics assessments related to number sense disaggregated by grade – Number ID	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Class 1 = 50.0% Class 2 = 71.2%	Class 1 = 64.0% Class 2 = 80.0%	Class 1 = 68.1% Class 2 = 83.0%
	2.A1b: % average score of participating learners on mathematics assessments related to number sense disaggregated by school type – Number ID	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Formal 1 = 58.0% LCPS = 66.0%	Formal 1 = 69.5% LCPS = 80.0%	Formal 1 = 71.7% LCPS = 81.4%
	2.A1c: % average score of participating learners on mathematics assessments related to number sense disaggregated by gender – Number ID	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Male = 60.5% Female = 61.6%	Male = 72.2% Female = 72.6%	Male = 75.3% Female = 75.3%
	2.A2a: % average score of participating learners on mathematics assessments related to number sense disaggregated by grade – Quantity Discrimination	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Class 1 = 29.3% Class 2 = 51.9%	Class 1 = 42.7% Class 2 = 67.6%	Class 1 = 48.3% Class 2 = 71.55
	2.A2b: % average score of participating learners on mathematics assessments related to number sense disaggregated by school type – Quantity Discrimination	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Formal 1 = 40.0% LCPS = 43.4%	Formal 1 = 53.0% LCPS = 63.5%	Formal 1 = 55.9% LCPS = 65.4%

Intermediate Results	Indicator	Data source	Reporting frequency	Targets					
				Proposed			Actual		
				2012	2013	2014	2012	2013	2014
	2.A2c: % average score of participating learners on mathematics assessments related to number sense disaggregated by gender – Quantity Discrimination	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Male = 41.3% Female = 41.0%	Male = 56.2% Female = 55.6%	Male = 60.6% Female = 58.4%
	2.A3a: % average score of participating learners on mathematics assessments related to number sense disaggregated by grade – Missing Number	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Class 1 = 17.0% Class 2 = 33.0%	Class 1 = 25.4% Class 2 = 42.85	Class 1 = 32.7% Class 2 = 54.3%
	2.A3b: % average score of participating learners on mathematics assessments related to number sense disaggregated by school type – Missing Number	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Formal = 22.5% LCPS = 24.9%	Formal 1 = 32.3% LCPS = 40.6%	Formal 1 = 40.0% LCPS = 48.5%
	2.A3c: % average score of participating learners on mathematics assessments related to number sense disaggregated by gender – Missing Number	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Male = 23.2% Female = 23.6%	Male = 35.0% Female = 34.3%	Male = 43.2% Female = 43.1%
	2.B1a: % average score of participating students on mathematics assessments related to computation disaggregated by grade – Addition Level 1	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Class 1 = 16.0 Class 2 = 35.1	Class 1 = 33.2 Class 2 = 52.	Class 1 = 39.2 Class 2 = 61.0
	2.B1a: % average score of participating students on mathematics assessments related to computation disaggregated by grade – Addition Level 1 with at least 8 out of 20 correct sums per minute	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Class 1 = 12. Class 2 = 47.	Class 1 = 43.5 Class 2 = 76.8	Class 1 = 53.2 Class 2 = 86.4

Intermediate Results	Indicator	Data source	Reporting frequency	Targets					
				Proposed			Actual		
				2012	2013	2014	2012	2013	2014
	2.B1a: % average score of participating students on mathematics assessments related to computation disaggregated by grade – Addition Level 1 with at least 12 out of 20 correct sums per minute	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Class 1 = 3.1 Class 2 = 13.3	Class 1 = 11.9 Class 2 = 41.6	Class 1 = 20.2 Class 2 = 61.0
	2.B1b: % average score of participating students on mathematics assessments related to computation disaggregated by school type – Addition Level 1	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Formal = 26. LCPS = 26.0	Formal = 41.1 LCPS = 48.3%	Formal = 46.4 LCPS = 55.2
	2.B1b: % average score of participating students on mathematics assessments related to computation disaggregated by school type – Addition Level 1 with at least 8 out of 20 correct sums per minute	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Formal = 30.9 LCPS = 31.3	Formal = 59.0 LCPS = 66.6	Formal = 63.9 LCPS = 78.0
	2.B1b: % average score of participating students on mathematics assessments related to computation disaggregated by school type – Addition Level 1 with at least 12 out of 20 correct sums per minute	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Formal = 8.5 LCPS = 8.3	Formal = 25.4 LCPS = 33.6	Formal = 34.4 LCPS = 48.9
	2.B1c: % average score of participating students on mathematics assessments related to computation disaggregated by gender – Addition Level 1	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Male = 26.7% Female = 25.2%	Male = 44.4% Female = 41.7%	Male = 49.8% Female = 49.6%
	2.B1c: % average score of participating students on mathematics assessments related to computation disaggregated by gender – Addition Level 1 with at least 8 out of 20 correct sums per minute	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Male = 33.5% Female = 28.5%	Male = 65.2 Female = 56.8	Male = 69.7 Female = 68.7

Intermediate Results	Indicator	Data source	Reporting frequency	Targets					
				Proposed			Actual		
				2012	2013	2014	2012	2013	2014
	2.B1c: % average score of participating students on mathematics assessments related to computation disaggregated by gender – Addition Level 1 with at least 12 out of 20 correct sums per minute	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Male = 9.1% Female = 7.7%	Male = 29.8 Female = 25.4	Male = 41.1 Female = 38.7
	2.B2a: % average score of participating students on mathematics assessments related to computation disaggregated by grade – Subtraction Level 1	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Class 1 = 7.2 Class 2 = 21.1	Class 1 = 19.7 Class 2 = 34.7	Class 1 = 26.5 Class 2 = 44.0
	2.B2a: % average score of participating students on mathematics assessments related to computation disaggregated by grade – Subtraction Level 1 with at least 8 out of 20 correct sums per minute	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Class 1 = 3.84 Class 2 = 20.6	Class 1 = 15.9 Class 2 = 48.9	Class 1 = 29.4 Class 2 = 66.2
	2.B2a: % average score of participating students on mathematics assessments related to computation disaggregated by grade – Subtraction Level 1 with at least 12 out of 20 correct sums per minute	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Class 1 = 1.0 Class 2 = 2.9	Class 1 = 1.0 Class 2 = 7.4	Class 1 = 5.8 Class 2 = 24.7
	2.B2b: % average score of participating students on mathematics assessments related to computation disaggregated by School type – Subtraction Level 1	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Formal = 14.1 LCPS =	Formal = 25. LCPS =	Formal = 31.9 LCPS =
	2.B2b: % average score of participating students on mathematics assessments related to computation disaggregated by School type – Subtraction Level 1 with at least 8 out of 20 correct sums per minute	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Formal = 12.5 LCPS = 12.8	Formal = 30.5 LCPS = 41.0	Formal = 41.6 LCPS = 56.5

Intermediate Results	Indicator	Data source	Reporting frequency	Targets					
				Proposed			Actual		
				2012	2013	2014	2012	2013	2014
	2.B2b: % average score of participating students on mathematics assessments related to computation disaggregated by School type – Subtraction Level 1 with at least 12 out of 20 correct sums per minute	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Formal = 2.2 LCPS = 1.7	Formal = 4.4 LCPS = 4.0	Formal = 13.4 LCPS = 17.5
	2.B2c: % average score of participating students on mathematics assessments related to computation disaggregated by gender – Subtraction Level 1	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Male = 14.5 Female = 14.4	Male = 28.6 Female = 26.5	Male = 34.1 Female = 35.0
	2.B2c: % average score of participating students on mathematics assessments related to computation disaggregated by gender – Subtraction Level 1 with at least 8 out of 20 correct sums per minute	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Male = 13.3 Female = 11.9	Male = 31.8 Female = 31.8	Male = 46.5 Female = 47.9
	2.B2c: % average score of participating students on mathematics assessments related to computation disaggregated by gender – Subtraction Level 1 with at least 12 out of 20 correct sums per minute	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Male = 2.4 Female = 1.6	Male = 4.8 Female = 3.8	Male = 15.2 Female = 14.6
	2.B3a: % average score of participating students on mathematics assessments related to computation disaggregated by grade – Word Problems	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Class 1 = 13.6% Class 2 = 25.2%	Class 1 = 16.5% Class 2 = 31.2%	Class 1 = 33.4% Class 2 = 47.6%
	2.B3b: % average score of participating students on mathematics assessments related to computation disaggregated by school type – Word Problems	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Formal = 19.9% LCPS = 19.3%	Formal = 23.7% LCPS = 25.7%	Formal = 39.9% LCPS = 40.9%

Intermediate Results	Indicator	Data source	Reporting frequency	Targets					
				Proposed			Actual		
				2012	2013	2014	2012	2013	2014
	2.B3c: % average score of participating students on mathematics assessments related to computation disaggregated by gender – Word Problems	EGMA database	Annual	TBD	10% over baseline	20% over baseline	Male = 20.0% Female = 19.4%	Male = 24.6% Female = 23.9%	Male = 40.4% Female = 40.2%
	2.C. % average score of overall math index based on EGMA	EGMA student instruments/EGMA database	Annual	TBD	15% over baseline	30% over baseline	Class 1 = 12.1% Class 2 = 14.3%	Class 1 = 35.3% Class 2 = 33.3%	Class 1 = 43.7% Class 2 = 47.4%
	2.D: % of observed classroom lessons using PRIMR lesson plans for mathematics	PRIMR coach/tutor or observation	Annual	40%	60%	70%	100%	100%	100%
	2.E Number of learners assessed in mathematics by teachers using EGMA-like tools	PRIMR records	Annual	TBD	1500	500	1134	2799	3825
Sub IR 2.1.1: Curriculum/lesson plans/classroom materials for mathematics instruction strengthened									
	2.1.1.A: # of observed classrooms with PRIMR lesson plans for mathematics	PRIMR coach/Tutor observation	Annual	TBD	50%	70%	100%	100%	100%
	2.1.1.B: Number of observed schools with mathematics materials for children	PRIMR coach/Tutor observation	Annual	TBD	70%	85%	100%	100%	100%

Intermediate Results	Indicator	Data source	Reporting frequency	Targets					
				Proposed			Actual		
				2012	2013	2014	2012	2013	2014
	2.1.1C: Total number of mathematics books and learning materials provided with USAID support	PRIMR records	Annual	10,000	25,000	6,000	13,408	35,408	49,023
Sub IR 2.1.2: Teacher capacity to implement and use periodic student mathematics assessments strengthened									
	2.1.2.A: Number of schools participating in mathematics competitions	PRIMR records	Annual	120	300	100	125	370	471
	2.1.2.B Number of schools sharing school report cards in math with community	PRIMR records	Annual	120	300	100	125	370	471
IR 3: MOE capacity to implement wide-scale actions to improve basic reading and math skills strengthened	IR 3: MOE and NGO resources dedicated to provision of early grade reading and math increased								
	3.A: Number of MoEST/ NGO/ CBO staff that participated in lesson plans and materials development for reading	Workshop and training attendance sheets	Annual	30	15	15	20	10	36
	3.B: Number of MoEST and NGO/CBO staff that participated in lesson plans and materials development for mathematics	Workshop and training attendance sheets	Annual	15	15	15	20	10	36
	3.C: Number of MoEST, NGOs/CBO staff attending PRIMR policy discussions	PRIMR records/ attendance sheets	Annual	50	100	100	0	69	52
	Sub IR 3.1.1: Public-private partnerships to support early grade reading and math increased								

Intermediate Results	Indicator	Data source	Reporting frequency	Targets					
				Proposed			Actual		
				2012	2013	2014	2012	2013	2014
	3.1.1: Number of public-private partnerships working in support of improved early grade reading and mathematics	PRIMR records	Annual	2	1	1	2	2	2
Sub IR 3.2: MOE laws, regulations, and policies in support of early grade reading and math strengthened									
	3.2A: Number of laws, policies, regulations, or guidelines developed or modified to improve primary grade reading programs or increase equitable access	MoEST records	Annual	1	0	0	0	0	3
	3.2B: Number of EGRA/EGMA and policy dissemination workshops held at national and district levels.	PRIMR records	Annual	5	5	5	0	12	2
	3.2C: Number of MoEST officials, teachers, NGO members, and policy makers attending EGRA/EGMA dissemination workshops	PRIMR records	Annual	60	60	60	0	390	58
Sub IR 3.3: PTTCs' exposure to improved pedagogy for early grade reading and math increased									
	3.3 Number of PTTC staff attending workshops related to early grade reading and math	PRIMR records	Annual	5	5	5	1	1	0
USAID Standard Education Indicators not covered above									
	1.F1: Number of learners enrolled in USG-supported primary or equivalent LCPSs **(IIP 2.1 indicator)	Class-room rolls at school level	Annual	TBD	TBD	TBD	3511	11,183	27,263

Intermediate Results	Indicator	Data source	Reporting frequency	Targets					
				Proposed			Actual		
				2012	2013	2014	2012	2013	2014
	1.F2: Number of standardized learning assessments supported by USAID	PRIMR records	Annual	1	1	1	2	5	3
	1.F3: Number of learners receiving reading interventions at the primary level	School enrollment logs	Annual	14,000	35,000	10,000	13,408	34,562	56,030
	1.F4: Number of schools using ICT due to USAID support	PRIMR records	Annual	100	300	100	0	403	547
	1.F5: Number of impact evaluations conducted	PRIMR records	Annual	1	2	2	1	5	3
	1.F6: Number of parent-teacher associations or similar "school" governance structures supported	PRIMR records	Annual	140	360	90	126	371	547